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# The American STATISTICIAN

The news publication of the  
AMERICAN STATISTICAL ASSOCIATION

APRIL-MAY, 1953  
Volume 7, No. 2

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## **ASA PLANS CONTRIBUTED PAPERS SESSIONS AT 1953 ANNUAL MEETING**

Professor Herbert Solomon, Chairman of the Program Committee, has announced that there will be two sessions for contributed papers — one for the joint meeting of the Biometric Section-ASA and the Biometric Society, and one for a general session of the American Statistical Association. Plans for the former will be announced at a later date. Anyone interested in reading a paper at the general session, which can be in any area of interest to the ASA, should send a copy of the proposed paper to Professor Max Woodbury, Dietrich Hall, University of Pennsylvania, Philadelphia, who will act as coordinator for this session.

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### **THE FUTURE ANNUAL MEETINGS OF THE ASSOCIATION WILL BE HELD AS FOLLOWS:**

	<u>Headquarters</u>	<u>Dates</u>
1953—Washington, D. C.	Shoreham Hotel	December 27-30, 1953
1954—Montreal, Canada	Hotel Mt. Royal	September 10-13, 1954
1954—Regional Meeting, San Francisco	(This will be held in December. Final dates and hotel have not yet been chosen.)	
1955—New York City	Hotel Biltmore	(Late in December. Final times not yet chosen.)

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## The American STATISTICIAN

APRIL-MAY, 1953, VOL. VII, NO. 2

The news publication of the  
American Statistical Association

Founded 1839

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The Editorial Committee welcomes the submission of manuscripts for possible publication. Two copies, double-spaced, should be sent to the Editor, Almarin Phillips, E-140 Dietrich Hall, University of Pennsylvania, Philadelphia 4.

News and notes should be sent to Dana Barbour, News Editor, American Statistical Association, 1108 16th Street, N.W., Washington 6, D. C.

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Anyone wishing to change their mailing address should allow eight weeks' notice. A copy of the address taken from an issue of the periodical should accompany the change-of-address request.

## REPORT OF THE COMMITTEE ON ELECTIONS

The Committee on Elections has nominated the following persons as candidates for office in 1954:

President-Elect .....	Ralph J. Watkins Dun & Bradstreet, Inc.
Vice-President (1954-56) .... (One to be elected)	Mortimer Spiegelman Metropolitan Life Insurance Co.  Henry Scheffe Columbia University
Directors (1954-56) .....	Donald C. Riley Bureau of the Budget  Joseph Berkson Mayo Clinic  Jacob Marschak Cowles Commission  John W. Hopkins National Research Laboratory, Ottawa
Representative-at-Large .....	Daniel B. DeLury (1954-55) Ontario Research Foundation  (One to be elected) Lazare Teper International Ladies Garment Workers Union

In accordance with the Constitution, additional nominations may be made within five weeks after this publication by petition signed by at least twenty-five members and submitted to the Secretary-Treasurer. Ballots will be mailed in November at the time of the general mailing for 1954. These ballots will contain biographical material on each of the candidates.

# NEWS

## Interagency Transfers of Statistical Schedules — Summer Session at Berkeley — Operations Research Society Meeting — Conferences — Publications

### ASA Advisory Committee on Statistical Policy Statement on Interagency Transfers of Statistical Schedules

The American Statistical Association's Advisory Committee on Statistical Policy has submitted to the Office of Statistical Standards, Bureau of the Budget, a "Statement of Principles with Respect to Transfer of Statistical Schedules Among Federal Agencies." The Committee's study of the question was made at the request of the Office of Statistical Standards, in compliance with the recommendation of the Hoover Commission's Task Force on Statistical Agencies that a study be made, with participation of experts from outside the government service,

"To determine to what degree provisions concerning the confidential character of certain reports to Federal agencies make for duplication of activities and for heavier burdens on respondents; [and] to explore means by which such information can be placed at the disposal of other Federal agencies under rules affording proper protection of individual respondents."

After consultation with representatives of a number of Federal agencies and with business respondents, and full consideration of all the problems involved, the Committee concluded that "while proper provision against public disclosure of data is essential, present limitations on disclosure impair the integration of statistical collections, lead to additional burdens on respondents, and cause unnecessary expenditures for collection of statistics. They also lead to poorer statistics and limit the availability of useful information which the Federal Government has collected." On the basis of its study, the Committee believes that the following principles should be applied with respect to access to or transfers of individual statistical schedules:

1. Transfers of individual returns collected for statistical purposes should be made only for a substantial statistical purpose. Definite safeguards should be established within every agency whereby transferred individual reports are prevented from (a) being made available for taxation or regulation and to enforcement officers for use in making comparisons or developing other leads for investigation, and (b) being disclosed to the public.
2. Lists of business establishments containing names, addresses, and classifications, such as size and industry, should also be available to any other Government agency for statistical purposes, but not for purposes of compliance or enforcement. Where such lists are used for selection of a sample group of correspondents, care should be taken to prevent the inclusion of particular respondents in sample surveys more often than necessary.
3. No transfers of individual schedules obtained under a pledge of confidentiality should be made unless reviewed and approved by the Office of Statistical Standards. The same rule should apply to lists of business establishments showing industry classification, number of employees, etc., compiled from surveys conducted under a pledge of confidentiality.

The Committee's statement of principles is now being studied by the Office of Statistical Standards, preparatory to issuance of a policy statement governing such transfers for use in review of proposed reporting plans and forms under the Federal Reports Act. Particular attention is being given to administrative or legal obstacles which might be encountered by agencies in applying the principles, as pointed out by the Committee.

The Advisory Committee on Statistical Policy was established in October 1951 to advise the Office of Statistical Standards, and through it the Federal statistical system, on broad matters of public policy in the statistical area. Other topics now under study by the Committee include the review of research contracts with nongovernmental agencies and direct government versus private collection of statistics. The Committee is composed of past presidents of the American Statistical Association who are not at present affiliated with any Federal agency. Its present membership is Samuel S. Wilks (chairman), William G. Cochran, E. Dana Durand, Simon Kuznets, Isador Lubin, Frederick C. Mills, William F. Ogburn and Lowell J. Reed. E. A. Goldenweiser, who served as chairman for the first year, had resigned from the Committee. William J. Carson of the University of Pennsylvania and the National Bureau of Economic Research serves as secretary, and Stanley Lebergott of the Office of Statistical Standards as assistant secretary.

### Summer Sessions at Berkeley, California

This year's summer program at the Statistical Laboratory of the University of California, Berkeley, California, consists of two sessions: June 22 - August 1 and August 3 - September 12. The faculty of the summer sessions will include Professor David Kendall of Magdalen College, Oxford University; Professor J. Neyman, Dr. T. A. Jeeves, and Mr. A. Shapiro of the Statistical Laboratory, University of California.

The program includes two of the usual undergraduate courses in each session. In addition Professor Kendall will give a new course in the first session, "Stochastic processes associated with population growth and with the theory of queues." Professor Neyman will be available for consultation on work leading to higher degrees.

### Annual Meeting of Operations Research Society

The Operations Research Society of America will hold its annual meeting at Case Institute of Technology in Cleveland, Ohio, on May 15 and 16, 1953. The program includes symposia on: What is Operations Research?, The Use of Sampling Theory in Operations Research, Linear Programming, Game Theory in Operations Research, Teaching of Operations Research; and sessions with contributed papers.

Inquiries concerning the meeting should be addressed to Professor David B. Hertz, Department of Industrial Engineering, Columbia University, New York 27, N. Y.



## International Statistical Institute Holds 28th Session

The International Statistical Institute has announced that its 28th session will be held at Rome September 6-12, 1953 at the invitation of the Italian Government. The role of statistics in the improvement of industrial productivity has been selected as the main subject for the session. Meetings have been scheduled on the measurement of productivity, labor force as related to productivity, the role of statistics in industrial standardization, and other problems related to industrial productivity. Meetings have also been scheduled on regional cooperation in statistics, statistical education, agricultural statistics, educational and cultural statistics, and contributed papers. A joint meeting with the International Union for the Scientific Study of Population will be held on Population statistics. Meetings of the Biometric Society and the International Association for Research in Income and Wealth are also being held in Italy during the period immediately preceding the ISI session.

## Third International Biometric Conference

The Third International Biometric Conference will be held at Bellagio, on Lake Como in northern Italy, September 1-5, 1953, under the sponsorship of the Biometric Society, a Section of the International Union of Biological Sciences. Ten half-day sessions are being planned from among the following subjects: training in biometry, mathematical problems in genetics, industrial applications of experimental designs, agricultural designs, public health and social medicine, biological assay with special reference to immunology, biometrical problems in ecology, functional relations in experimentation, methodological problems in biometry, and sequential experimentation.

The Ninth International Genetics Congress will also be held at Bellagio from August 24-31, while the Sixth International Microbiological Congress will meet in Rome from Sept. 6-12.

Because of limited hotel accommodations at Bellagio, persons expecting to attend the Conference should register as soon as possible with the Secretary of the Biometric Society, Box 1106, New Haven 4, Conn.

## UN Statistical and Demographic Yearbooks, 1952

The Statistical Office of the United Nations has recently published the 1952 issues of the *Statistical Yearbook* and the *Demographic Yearbook*. These are the fourth in the series of such volumes, and are similar in content and arrangement to previous issues, but contain some new tables, additional detail on some subjects, and figures for a larger number of countries.

The *Statistical Yearbook* contains 177 tables, most of them covering the period 1932-1951, although some data for 1952 are included. Statistics on population, employment and unemployment, agricultural production and livestock population, industrial production, manufacturing, mining and quarrying, construction, electricity and gas, consumption of food and raw materials, transportation and communications, wholesale and retail trade, imports and exports, balance of payments, wages and prices, national income, finance, public finance, social security, housing, and education and culture are included. A special effort was made to present the statistical series for the various countries on as comparable a basis as possible, and to that end index numbers have been converted to a common base (1948=100).

The *Demographic Yearbook* includes 35 statistical tables on population, births, stillbirths, deaths, marriages and divorces, population movements and life tables. The central theme of the issue is the geographical distribution of population. This is reflected in an interpretive chapter on "Urban Trends and Characteristics" as well as in the tables and maps.

The 1952 issues of the *Statistical Yearbook* and the *Demographic Yearbook* may be purchased at \$7.50 each, cloth bound, or \$6.00 each, paper bound, from the International Document Service, Columbia University Press, 2960 Broadway, New York.

## Conference on Definition and Measurement of Standards of Living

A conference of U. S. experts to discuss the definition and measurement of standards of living for international comparisons was held in New York at the end of January under the sponsorship of the Public Administration Clearing House.

The origin of the conference lay in a resolution by the UN Economic and Social Council recommending that a group of experts report "on the most satisfactory methods of defining and measuring standards of living and changes therein in the various countries, having regard to the possibility of international comparisons." The conference was convened by the Public Administration Clearing House to consider this problem informally and provide some guide lines which might be of value to the experts who are to be designated by the United Nations.

Members of the group, serving in individual capacities, included: Stuart A. Rice, Chairman (U. S. Bureau of the Budget), Persia Campbell (Queens College), Faith Clark (U. S. Department of Agriculture), J. M. Clark (Columbia University), Cora du Bois (Institute of International Education), Philip Hauser (University of Chicago), Samuel P. Hayes, Jr. (Mutual Security Agency), Bengt S. Helger (UN), Simon Kuznets (University of Pennsylvania), Bruno Lasker (social investigator and author), Douglas H. K. Lee, M.D. (Johns Hopkins), Donald V. McGranahan (UN), Harvey Perloff (University of Chicago), William H. Sewell (University of Wisconsin), Knud Stowman, M.D. (Federal Security Agency), Faith Williams (Department of Labor) and Thomas J. Woofert (Bureau of the Census). Mr. Charles S. Ascher, Acting Associate Director, represented the Public Administration Clearing House, and S. M. Miller (Brooklyn College), aided by N. T. Wang (UN), acted as rapporteur.

A report of the discussion has been prepared for the UN panel of experts which is scheduled to meet in the early summer.

## The American Economy in 1960

The National Planning Association has published a study by Gerhard Colm, assisted by Marilyn Young, on "The American Economy in 1960—Economic Progress in a World of Tension." This study examines the changes which might take place if the national security program should be reduced from a possible peak of \$60 billion to a maintenance level of \$40 billion or \$50 billion by 1960. Various hypothetical patterns of full employment are analyzed, and the necessary budget, tax, private and public investment, and wage and price policies are discussed.

## Seventh Session of U. N. Statistical Commission

The United Nations Statistical Commission held its seventh session at U. N. Headquarters in New York, February 2-13. Stuart A. Rice, Assistant Director for Statistical Standards, Bureau of the Budget, was the United States representative. Peyton Stapp and Harry Venneman, Office of Statistical Standards, and Maxwell R. Conklin and J. Edward Ely, Bureau of the Census, served as advisers. Other countries represented were Argentina, Australia, Canada, China, Czechoslovakia, Denmark, Egypt, France, India, Netherlands, Panama, Ukrainian S.S.R., U.S.S.R., and the United Kingdom.

The seventh session took important steps in the fields of external trade statistics, migration and vital statistics, industrial statistics, statistics of capital formation, and wholesale prices.

In the field of external trade statistics, agreement was reached on a number of specific recommendations, including acceptance of the principle of c.i.f. transaction value in the compilation of external trade statistics, either as the basis used for national data or for supplementary tabulations to be made available for purposes of international comparability.

Recommendations for improvement of international migration statistics and a set of principles for a vital statistics system, which had been considered in draft form at previous sessions of the Population and Statistical Commissions, were adopted with some modifications, and draft resolutions on both subjects were approved for submittal to the Economic and Social Council.

The Commission agreed upon a statement of guiding principles and standard definitions for use in compilation of basic industrial statistics, and formulated a draft resolution for consideration by the Economic and Social Council to bring the recommendations to the attention of governments.

Agreement was reached on a set of detailed definitions, concepts and classifications to be recommended to countries for use in the compilation of statistics of capital formation. The recommendations are couched in terms sufficiently flexible to allow considerable latitude to countries in applying them.

The commission commended a report prepared by a committee of national income experts entitled, "A System of National Accounts and Supporting Tables," but decided that further study would be desirable as a basis for agreement on definitions and principles that would be generally applicable. The Secretary-General was requested to circulate this report and to assist countries wishing to adopt it as a framework for their national accounts.

With respect to wholesale price statistics, the Commission adopted a series of specific recommendations dealing with such points as the desirability of establishing an adequate system for the collection and publication of wholesale price data, the field to be covered, the need for indexes for individual commodities, the method of weighting, the formula, the base period, and the frequency of review and revision of weight bases. There was some disagreement on the question of the system of index numbers into which the price series should be combined, however, and the Secretariat was requested to undertake further discussions with national statistical offices and appropriate specialized agencies.

The Commission concurred with the recommendations of the Sub-Commission on Statistical Sampling concerning steps to continue the work previously undertaken by the Sub-Commission. The work of the International Monetary Fund on balance of payments statistics, construction of financial statistics, and drafting a money and banking manual was noted with appreciation, and views were expressed and suggestions made as to future

work in this area. Similar action was taken with respect to reports of the International Labor Organization on its work in the field of retail prices and on classification of occupations, and a report by the International Chamber of Commerce on work in the field of distribution statistics. The Commission requested that the Secretariat prepare an annotated list and abstract of existing international recommendations on statistical concepts, definitions, classifications and methods.

Copies of the full report on the session are available from the Statistical Office of the United Nations.

## Seventh Session of U. N. Population Commission

The seventh session of the United Nations Population Commission was held at U. N. Headquarters in New York, January 19-30. The United States delegation included Roy V. Peel, Director of the Census Bureau, as Acting U. S. Representative; Conrad Taeuber, Assistant Director of the Census Bureau, as Acting Alternate Representative; and Dudley Kirk, Department of State, as Adviser. Other countries represented were Australia, Belgium, Brazil, China, France, Indonesia, Iran, Mexico, Peru, Sweden, Ukrainian S.S.R., U.S.S.R., the United Kingdom, and Yugoslavia.

The agenda included the inter-relationships of demographic, economic and social factors; fertility and mortality studies; research in migration and revision of draft recommendations for the improvement of migration statistics; demographic seminars and training courses; and revision of draft recommendations for improvement and standardization of vital statistics. The Commission determined that its future program of work should be concentrated on four major lines of interest: the inter-relationships of demographic, economic and social factors; future population trends; migration; and continuing Secretariat services, including technical assistance.

Copies of the full report of the session are available from the Population Division of the United Nations.

## Southern Regional Conference on Statistics

The Regional Conference on Statistics, held in Atlanta on Oct. 3-4, 1952, was attended by 50 delegates from 28 Southern Colleges and Universities. This Conference was arranged by the Southern Regional Education Board, which is a public educational agency established by legislative action of the fourteen Southern states to plan educational programs in specialized fields so that they will supplement one another and more effectively serve the region. The purpose of the Conference was to discuss possibilities for coordination of statistical activities among the colleges and universities represented and to consider the feasibility of a regional program.

The Conference recommended that the Southern Regional Education Board join administrative officials of the institutions in finding ways to: assemble and distribute information on current practices in statistics instruction, research and service; develop collaboration, where desired by the institutions, among themselves and with government and industrial agencies in planning and carrying on statistical instruction, research and service; and tailor new developments to the needs and organization pattern peculiar to each institution while providing outside guidance based on experience. The Conference voted unanimously that the Southern Regional Education Board appoint a committee from among Conference delegates to advise it in its further exploration with administrative officials and in acting on recommendations of the group reports.

## Federal Statistical Activities

### Revised Consumer Price Index

The Bureau of Labor Statistics has completed the comprehensive revision of the Consumer Price Index, and publication of the revised index began with that for January 1953, released February 27. The January release is in a new format, with 8 major groups and 13 subgroups. The new index is on the recommended postwar base period of 1947-49, and differs from the old with respect to the number and type of commodities and services priced, the cities included, and the retailers visited. New weights have been established, reflecting urban expenditure patterns for 1952, based on consumer expenditure data for the year 1950 obtained in a nationwide survey.

A description of the revised index is presented in a 10-page "Short Description of the Consumer Price Index" issued in January by the Bureau of Labor Statistics. A special section on the revised index is also included in the February 1953 issue of the *Monthly Labor Review*. This section includes a statement on the main features of the revised index, with a tabular comparison of the old, adjusted, and revised Consumer Price Index series for such items as basis of index weights, population coverage, city coverage, and commodity coverage. The section also includes excerpts from four papers delivered at the annual meeting of the ASA last December, offering a more extended discussion of the theoretical formulation of the revised index.

Compilation and publication of the "old series" and the "adjusted series" of the Consumer Price Index were discontinued at the end of 1952, upon completion of the 3-year comprehensive revision program. Compilation of the "old series" has been resumed, however, for the 6-month period of January through June 1953. The temporary resumption of the old series was directed by the President in order to facilitate the transition to the new, or revised, index for use in escalator clauses in wage contracts.

EDWARD D. HOLLANDER

Chief, Division of Prices and Cost of Living,  
Bureau of Labor Statistics, Department of Labor

### 1953 Censuses of Industry and Trade

Preparatory work for censuses of manufactures, mineral industries, wholesale and retail trade, services and transportation covering the year 1953 is now well under way. These censuses will cover the Continental United States and the territories, Alaska and Hawaii; it is planned to cover the possession, Puerto Rico, but no other possessions. A total of more than three million business establishments with more than 30 million employees will be covered.

#### I. Manufactures, Mineral Industries, Wholesale and Retail Trade and Services

1. *Report Forms*—For the manufactures census approximately 200 report forms will be used, as in 1947, the year covered by the previous Census of Manufacturers. The product and materials sections of these forms are again adapted to the needs of particular industries. The general form will contain in addition to the usual questions on identification, kind of business, employment, payrolls and hours of work, cost of materials and value of shipments, an inquiry on power equipment, not included since the 1939 Census of Manufactures, and a new question on water consumption. A short form with much simplified versions of the principal questions on the long form will again be used; it is planned to send the short form to many more of the smaller establishments in 1953 than in 1947.

For the mineral industries census, approximately 40 different forms will be used, with the product and certain other sections adapted to the individual industries. Insofar as possible, the same types of information will be obtained for mining as for manufacturing. This will furnish, in general, statistics comparable with those obtained in the previous Census of Mineral Industries which covered the year 1939.

For the census of wholesale and retail trade and services, there will be about 55 different standard trade and service forms as compared to 16 in 1948. The expansion in forms arises from the need demonstrated by the 1948 experience to develop inquiries specifically adapted to the operations and terminology of various major types or groups of businesses. Most forms contain questions on location, kind of business, corporate relations, payrolls and employment, operating expenses, inventories, annual sales, credit sales, and merchandise lines. In addition to the standard forms, there will be a simplified form for small establishments. This form contains relatively simple questions on location, kind of business, receipts, and payrolls and employment. In the retail field, as in 1948, there will be a sampling operation which will permit most small retailers to use only the simplified form.

A separate form is again being prepared to cover the activities of central administrative offices and auxiliaries such as central warehouses, research units, and garages. A company establishment summary form is also under consideration. This form would request the companies to summarize the number of reporting units and employment for each of the major census divisions (e.g., manufactures, mineral industries, wholesale trade, retail trade, services, etc.) and to provide an employment total for all the activities falling outside the scope of the Census.

2. *Preliminary Listing of Establishments of Multiunit Companies*—A preliminary listing of the establishments of most companies with more than one store, shop or factory will be made during the spring and summer of 1953. This listing is primarily for the purpose of making advance arrangements for the distribution and collection of appropriate report forms in the Census.

Altogether approximately 75,000 known multiunit companies, with about 350,000 separate establishments will be covered. Some large single-unit companies will also be included as a check on Census records of the organizational status of such units. Very large out-of-scope companies will also be included to check on the accuracy of the "out-of-scope" industry classifications of the establishments of such companies.

The preliminary canvass forms will require companies to report only names, addresses and business descriptions for all their separate establishments. No "book" figures will be required. The form sent to larger companies will have attached a list of establishments from the Census records, for correction and revision. Smaller companies will get no advance lists, but samples of the types of activities to be reported separately will be included in the instructions accompanying these listing forms. The companies will be asked to check the completeness of the establishment listings to make certain that all employment reported to BOASI is accounted for by the listed establishments.

3. *The Census Collection Program*—A major change in Census collection techniques will be made in the 1953 Censuses. The traditional field canvass by Census enumerators will be eliminated. Reports will be obtained instead partly from a mail canvass of employers listed in the records of the Bureau of Old-Age and Survivors Insurance (OASI) of the Social Security Administration, and partly from information reported by small business establishments to the Bureau of Internal Revenue (BIR).



At the beginning of 1954 forms will be mailed to a list of about two million establishments that are classified within the industrial scope of the 1953 Censuses. This list will be developed from the OASI list of employers and the Census preliminary listing of establishments. Statistics for establishments with no employees will be obtained from 1953 income tax returns filed with the BIR. BIR Form 1040 Schedule C will be used for individual proprietors with no employees and Form 1065 for partnerships with no employees. A survey of a small sample of the establishments with no employees will provide national statistics on lines of merchandise, credit, and other detailed information not reported on the income tax forms.

The use of administrative records as a basis for obtaining Census reports will make it possible to avoid completely the need for hiring, training, supervising and paying the many enumerators who would be needed for a field canvass. This procedure will not only significantly reduce the costs of the Censuses, but will also eliminate the necessity for filing separate Census reports for more than a million small establishments.

Investigations have indicated that this procedure will result in censuses of equivalent quality and content, and perhaps superior coverage, to those carried out in 1947-48 by more conventional collection techniques. The strict confidentiality with which all returns are treated by the Census Bureau will, of course, be applied to all information obtained from the BIR and OASI. Pilot studies of this procedure are now under way.

## II. Transportation

Taking into account the large volume of data already available on some phases of transportation, the Census Bureau is planning this program in such a way as to fill major gaps in existing transportation statistics rather than as a comprehensive census of this field. This transportation statistics program consists, therefore, of a series of special surveys.

A survey of commodity movements beyond local areas by trucks, not subject to Interstate Commerce Commission economic regulation, will provide measures of the total tons and total ton-miles of traffic handled. It is expected that this survey will yield data that can be added to similar information for other types of carriers to give a total for all means of transport in the Nation as a whole. A survey of truck ownership will provide data with respect to the physical characteristics of trucks, principal business of truck owners, types of truck services and other measurements of truck operation. A survey of industry's use of transportation services will provide data showing the total volume of manufacturing shipments in the United States and relative amounts moved by railroads, trucks and other types of carriers. A survey of for-hire trucking establishments to provide the customary establishment type data on number of employees, pay-rolls, revenues and number of vehicles is under consideration. Finally, a handbook of transportation statistics will provide extensive reference material to transportation data released for public use by all recognized public and private statistical agencies. Besides abstracts of the most important transportation data this handbook will give technical descriptions of the series shown and will define the technical terms; it will reconcile, insofar as possible, apparent conflicts among the series; and it will present detailed references to other source material in the entire field of transportation statistics.

## III. The Census Current Business Report

In order to check completeness of coverage of the census, a sample survey covering retail and service establishments in a sample of areas throughout the United States will be made each month during 1953. This survey, referred to as the "Census Current Business Report" (CCBR), will provide national figures monthly on retail trade sales and receipts from services and will

provide a measure in both retail and service industries which will more appropriately reflect business deaths and seasonal activities than a Census. Moreover, with better trained interviewers in the CCBR, this survey should reflect the net "misses" that usually occur in a large-scale operation such as a complete Census. In addition to the Census measures, the CCBR will provide a reconciliation of the Census and current program data. It is hoped that the experience in the use of CCBR as a check of the Census can also be used to introduce marked improvements in the current business program.

HOWARD C. GRIEVES,  
Assistant Director, Bureau of the  
Census, Department of Commerce

## Studies of Federal Funds for Scientific Research and Development

The National Science Foundation is conducting two studies dealing with funds administered by Federal agencies for scientific research and development. The studies are being made to aid the Foundation in its function of developing a national science policy.

The first of these studies covers amounts obligated for work at nonprofit institutions in fiscal years 1951 and 1952. Collection of data was completed in October and a report will be issued by the Foundation in April, as a sales document through the Government Printing Office. This report analyzes the data by agencies administering the funds, by types of work (basic research, applied research, and development), broad scientific fields covered, institutional types, and geographical distribution. Because the educational institutions receive a preponderance of the funds, special analyses were made of these institutions, according to program type, type of control, size, etc.

The second study deals with total obligations and expenditures for scientific research and development of Federal agencies for all purposes (as contrasted with funds going to nonprofit institutions). Periods covered in the study will be fiscal years 1952 and 1953. Data for this study were collected early in 1953. Although not as detailed a study as the one on nonprofit institutions, the information will be capable of analysis by type of work done and scientific fields covered.

CHARLES GANT,  
Program Analysis Office, National Science Foundation

## Commerce Study of Post-Defense Markets

A study of *Markets after the Defense Expansion* has been published by the Department of Commerce "to inform the business community on factors affecting the level of civilian demand after the present defense program has reached its peak." The study was made by the Department of Commerce with the cooperation of the Committee for Economic Development and the assistance of a group of business and research economists.

In conducting the study, two surveys were made of future capital expenditures: one of 2,000 business firms, covering the year 1953; and the other of 84 large firms which usually account for about a third of total capital expenditures, covering the years 1953 through 1955. Chapters in the report deal with: the economy in transition; the outlook for Government purchasing; business intentions to invest; the consumer market; prospects for foreign trade; growth of the American economy; the problem of business fluctuations; a high-level market pattern; and market analysis by business.

Copies of *Markets after the Defense Expansion* may be purchased, at 55 cents each, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

## New Census Bureau Publication Series on Population of Foreign Countries

The Bureau of the Census has initiated a new series of publications (P-90) devoted to the population of foreign countries. Each report in this series will summarize important demographic information available for a given country from scattered sources, including documents in languages other than English or unavailable in the United States. The first two reports in the new series deal with West Germany and Israel.

"The Population of the Federal Republic of Germany and West Berlin" deals with the growth, geographic distribution and demographic characteristics of the population of the Federal Republic of Germany, the major characteristics of the economically active population, the characteristics and integration of migrants, prospects for population growth, and the population and manpower of West Berlin. Demographic and labor force statistics compiled from a wide variety of sources are presented in 35 tables. Copies may be obtained at 45 cents each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

"Israel: Jewish Population and Immigration" traces the growth and geographic distribution of the population of Israel and considers the prospects for further growth, examines the role of immigration in development of the country in the light of the number and characteristics of the immigrants, and discusses problems of immigrant absorption. Authoritative supporting statistical data are presented in 19 tables compiled from many sources in Hebrew and English. Copies may be obtained at 30 cents each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Other publications in the series, including reports on the populations of Czechoslovakia, Poland and Yugoslavia, are now being prepared.

W. PARKER MAULDIN,

Population and Housing Division, Bureau of the Census, Department of Commerce

## 1952 Edition of the Statistical Abstract of the United States

The Bureau of the Census has recently issued the 1952 edition of the *Statistical Abstract of the United States*, the one-volume reference source for social, political, economic and industrial statistics of the United States. Statistics for the 1952 edition were obtained from 72 Federal agencies and 42 private firms or research organizations.

A feature of the latest issue is a new section on "Comparative International Statistics," which presents data for approximately 70 countries on population, area, birth and death rates, manufacturing, imports, exports, farm crops and meat, electric energy, transportation, communications, education, and health. Other new material presented for the first time in the 1952 edition includes tables on national farm product, mineral reserves, participation in national elections, classification status of Selective Service registrants, sales of home appliances, income shares of upper and lower groups of the population, air carrier operating revenues and expenses and personnel, hourly and weekly earnings in current and constant dollars, characteristics of male veterans of World War II, purchasing power of the dollar, and others. A special appendix brings to date the historical series presented in *Historical Statistics of the United States, 1789-1945*, published in 1949.

Copies of the 1952 edition of the *Statistical Abstract* may be purchased, at \$3.25 a copy, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

WILLIAM LERNER

Office of Assistant Director for Statistical Standards, Bureau of the Census, Department of Commerce

## Report on Employment and Economic Status of Negroes

The Bureau of Labor Statistics has issued a report on "Negroes in the United States—Their Employment and Economic Status." Focusing on recent national trends, the study presents a wide range of data from a number of statistical agencies on the status of Negro men and women in relation to that of whites.

The pertinent background data include: birth and mortality rates, life expectancy, migration among States, movement from the rural South to cities, education and school enrollment. The material on recent labor force and employment trends discusses unemployment, status of married couples and different age groups in the labor force, trends in occupational and industrial employment since 1940, duration of employment in current jobs, and work-life expectancy. The comparative data on income and wages include facts on wage credits and insurance status under the Old-Age and Survivors Insurance program.

The report was prepared at the request of the Subcommittee on Labor and Labor-Management Relations of the Senate Committee on Labor and Public Welfare of the 82nd Congress. It is available, as BLS Bulletin Number 1119, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 30 cents a copy.

HELEN H. RINGE

Branch of Manpower Studies, Division of Manpower and Employment Statistics, Bureau of Labor Statistics, Department of Labor

## Report on Social Security Financing

A report on *Social Security Financing* has been published by the Social Security Administration. The report discusses the alternative revenue sources that might be used to finance social security programs, the appropriate distribution of social security costs, the present and potential future size of social security financial operations, the effect of social security programs on the distribution of income, on consumption and savings, on economic growth and stabilization and on the national welfare. Separate chapters deal with the financing of old-age and survivors insurance, of unemployment insurance and grant-in-aid programs. A statistical appendix brings together considerable historical and current data.

Copies of the report may be purchased, at \$1 each, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

IDA C. MERRIAM

Assistant Director, Division of Research and Statistics, Social Security Administration

## Position Vacant—Statistician (Analytical) GS-13 U. S. NAVAL ORDNANCE TEST STATION (INYOKERN) CHINA LAKE, CALIFORNIA

The position of Head, Data Reduction and Analysis Branch, Test Department at the Naval Ordnance Station (Inyokern) is vacant. Inquiries and applications are solicited from persons qualified for the Statistician GS-13 grade. The duties of the position involve the supervision of some 30 personnel engaged in the reduction of ballistic data and the related statistical analysis and control.

The position is located in the Mojave Desert approximately 150 miles northeast of Los Angeles. Comfortable air-conditioned housing is available, and the climate is dry and healthful. The entrance salary is \$8,360 per annum. Opportunity for advancement is good, especially for one interested in administrative work.

Correspondence should be addressed to the Professional Placement Branch, Code 6525, Personnel Department, U. S. Naval Ordnance Test Station, China Lake, California.



# RELIABILITY AND USABILITY OF SOVIET STATISTICS

*The four papers presented below are from a Symposium on the Reliability of Soviet Statistics which was held on December 29, 1952 at the Annual Meeting of the American Statistical Association in Chicago. The remaining articles from that Symposium will be published in the June-July issue of the American Statistician. Reprints of the papers will be available through the office of the Secretary of the Association about July 1.*

THE EDITOR

## INTRODUCTION

by **STUART A. RICE**  
Bureau of the Budget

The primary interests of most Western students of Soviet statistics have been social or economic rather than statistical. Soviet data have been utilized for the analysis of particular economic and social structures, developments and trends in the Soviet Union with incidental efforts, more or less thorough, to test the reliability and essential usability of these data. A general appraisal of the Soviet statistical organization and of the data it produces has been neglected, with the result that our knowledge concerning them is fragmentary and uneven.

The polarization of research around economic issues has thus contributed to wide differences of professional opinion concerning the reliability and usability of Soviet statistics. There are grounds to support contradictory opinions. For example, Soviet official doctrine requires that Marxian, Leninist and Stalinist dogmas provide the major premises of statistics and research; but it is possible to believe that these dogmas may not actually produce the distortions that non-communist minds would expect.

Again, semantic differences are concealed in arguments concerning such questions as the nature and extent of "falsification" in Soviet figures. Is distortion deliberate? If so, by whom, to mislead whom and for what purpose? Does the "falsification" mean, to use Professor Bergson's phrase, "free invention and double bookkeeping"?

The program on Soviet statistics presented by the American Statistical Association on December 29, 1952 at its annual meeting in Chicago was designed as a preliminary attempt to clarify questions of this nature by placing the Soviet statistical system itself at the focus of examination. Three of the five papers presented by American experts on Soviet economic and social affairs are reproduced in this issue of the *AMERICAN STATISTICIAN*. The remaining papers will be published in succeeding issues. It was recognized by these experts that general conclusions must be tentative rather than definitive, except for the conclusion that continued efforts to understand the system and its products are desirable.

More research on Soviet statistical organization and methods is needed because statistical data can be safely interpreted only in relation to the instruments and procedures that have produced them. We have such a background against which to make use of figures flowing from the fact-gathering agencies of the United States and other free nations. Soviet figures would be vastly more meaningful to non-communist statesmen and economists if these had access to even a relatively small amount of knowledge concerning the statistical organizations, activities and procedures that gave rise to the limited volume of Soviet figures that is available. Considerable progress in the assembly of such knowledge is here exhibited.

# THE ORGANIZATION AND OPERATION OF THE SOVIET STATISTICAL APPARATUS

by HARRY SCHWARTZ  
Syracuse University

Any consideration of the nature of the Soviet Union's economic organization makes it immediately clear that that nation must have a large and elaborate statistical organization. As is well known the Soviet government owns and operates much of that country's economy directly. In addition virtually the entire economy is directed by means of a centrally-formulated economic plan covering all significant areas of production and distribution domestically, as well as the nation's foreign economic relations. Obviously this kind of centralized control and operation over an economy involving over 200,000,000 persons would be impossible unless the administrators and planners of this economy had comprehensive and current statistical data to guide their decisions. The gathering and compilation of these data, equally obviously, require an organization and personnel commensurate with the tremendous task involved. Against this background the Soviet statement that the U.S.S.R. has over 2,000,000 bookkeepers, accountants, economists and statisticians engaged in this general field is quite credible.<sup>1</sup>

The skimpy quarterly and annual economic reports released by the Soviet government in recent years give, therefore, a most misleading notion of the volume and detail of current Soviet statistics. A much more adequate idea of the extent of Soviet statistics is given by the large statistical annuals, comparable to our own statistical abstracts, issued by the Soviet government until the mid-1930's under the general title, *Sotsialisticheskoye Stroitelstvo*, as well as by the even more detailed volumes issued almost two decades ago on such matters as statistics of labor and statistics of agriculture. Such rich volumes are presumably still issued, but now they are classified and unavailable to foreigners like ourselves who must infer their existence. The secret 1941 economic plan which, through the fortunes of war, came into the possession of the non-Soviet world after World War II is the latest large volume — this one having over 700 pages — giving us a concrete indication of the magnitude of Soviet statistical operations. What a tremendous aid it would be to all of us interested in the Soviet Union if we had available a *Sotsialisticheskoye Stroitelstvo* 1952, comparable in magnitude and coverage to the 1935 volume of that name! But such hopes are idle for the foreseeable future and presumably only a major lessening of world tension would ever again induce the Soviet government to make such information freely available.

Because of the tremendous extent of state ownership in the Soviet economy, the borderline between statistics and accounting is to some extent rather hazy in the Soviet Union. Since that country is from many points of view simply one giant integrated economic organism, it might be thought that the problems of collecting and analyzing its relevant numerical data are more akin to the internal accounting problems of a large — but far smaller — American enterprise such as General Motors than to statistics as we normally conceive this subject. That there is also some confusion on that subject in Soviet minds is evident from the fact that the organization which is now called the Central Statistical Administration was once known as the Central Administration for National Economic Accounting. For our purposes, however, it seems sufficient to say that study of the relevant Soviet literature suggests that in practice in the U.S.S.R. the distinction between bookkeeping and accounting on the one hand and statistics on the other is very similar to our own use of those terms. That is, the internal affairs of Soviet factories, farms, banks and the like are regarded as the area of bookkeeping and accounting, while the collection and analysis of data relating to a number of such quasi-independent enterprises (or relating to a number of or many individuals) is regarded as statistics.

It is not the purpose of this paper to go into the history of Soviet statistics in any detail, but a few historical remarks may be apropos. The first formal organization for this work was created by the Statute of Government Statistics signed by Lenin on July 25, 1918. The predecessor organization of the present Central Statistical Administration which was set up then carried out its first industrial census in 1918 and its first agricultural census in 1920.<sup>2</sup> A decree of March 10, 1932 gave the Central Administration for National Economic Accounting responsibility for approving or disapproving any large scale government statistical survey, while in 1934 the same organization was given the same powers respecting new accounting forms.<sup>3</sup> In 1939 this formerly independent organization was subordinated to the State Planning Commission and in 1943, by which time it had apparently been renamed the Central Statistical Administration, its regional organization at the provincial and republic level was combined with that of the planning group.<sup>4</sup> In August

<sup>2</sup> *Bolshaya Sovetskaya Entsiklopediya*, Moscow, 1947, vol. 52, cols. 753 and 760.

<sup>3</sup> *Slovar-Spravoshnik po Sotsialno-Ekonomicheskoi Statistike*, Gosplanizdat, Moscow, 1944, p. 31.

<sup>4</sup> *Ibid.*, pp. 4-5.

<sup>1</sup> *Vestnik Statistiki*, No. 2, 1952, p. 65.

1948 the Central Statistical Administration was separated from the State Planning Commission and again made an independent organization attached directly to and reporting to the Council of Ministers.<sup>5</sup> This is the present situation.

The Central Statistical Administration is today the key center of Soviet statistics and accounting. It gathers and analyzes data on all subjects of interest to the government, employing a large field staff spread throughout the country as well as a large central staff presumably lodged in Moscow. Its authority extends also to the control of the way in which bookkeeping, accounting and statistical work shall be done by other agencies. It also checks the accuracy with which statistical or accounting data are prepared by other agencies as well as the fidelity with which its instructions regarding statistical forms, definitions and the like are adhered to.<sup>6</sup>

Working with and in conformance with the general instructions of the C.S.A. are the organs of accounting and statistics in government departments and enterprises, the bookkeeping and accounting departments of local governmental units at the *raion* (county) and village level, and the bookkeeping and accounting personnel of the collective farms.<sup>7</sup> Current accounting of natural changes in the population (births, deaths, marriages, etc.) are carried out by local registry offices, the so-called ZAGS, while current accounting of internal migration is done by the Soviet militia (police) in accordance with the regulations on internal passports and police notification of movement. The village Soviets apparently are responsible for current registration of the rural population.<sup>8</sup> The Ministry of Health is apparently the key agency for medical statistics with data on illness collected on the basis of registration of persons using government clinics and other medical facilities.<sup>9</sup> What provision, if any, is made for collecting data on illness for persons consulting doctors as private patients — undoubtedly a small fraction of all Soviet citizens consulting doctors — this writer has been unable to ascertain.

#### ORGANIZATION OF THE CENTRAL STATISTICAL ADMINISTRATION

The Central Statistical Administration consists of a central staff for the entire country, with corresponding subordinate groups at the Union-Republican, and provincial and territorial (*oblast* and *krai*) levels. For the largest cities such as Moscow and Leningrad there are also independent statistical administrations, but gen-

erally at the city and *raion* levels the organization consists of a city or *raion* inspector with subordinate district inspectors under him.

The central staff of C.S.A. consists primarily of functional divisions, of which the following have been explicitly identified by references in *Vestnik Statistiki*, the C.S.A.'s official organ: industrial statistics, agricultural statistics, transport and communication statistics, cultural statistics, municipal economy statistics, material supply statistics, censuses, accountancy, personnel, and summary statistics. There presumably are other similar divisions, such as those handling financial or vital statistics, as well.

In addition to these functional divisions the central organization of the Central Statistical Administration has three ancillary groups attached to it, each on a cost-accounting (*khozraschet*) basis. These are *Blankoizdatelstvo* which print all accounting and statistical forms; *Scyuzmashuchet* which does research on mechanization of calculating work and apparently also produces accounting and calculating machines, including punch card equipment; and the Administration for Training Accounting Cadres which has a network of schools for accounting and statistical personnel.<sup>10</sup>

The C.S.A.'s organization at the republican and provincial levels, as well as in the largest cities, parallels the central staff's division into functional subgroups. Each area has a statistical administration (*Statupravleniye*) and corresponding functional divisions. At the lowest level of work there are city and *raion* inspectors with district inspectors under them, all of them subordinate to the different provincial statistical administrations or to the republican organization in those less important republics not having provincial organs. By means of this large and far-flung network the C.S.A. is able to follow statistical work throughout the length and breadth of the vast Soviet territory.

#### COLLECTION OF DATA

The Central Statistical Administration collects data chiefly in the following fashions: registration as required by law, regular reports, censuses, and sample surveys. There is no space here, nor is the knowledge fully available, to give a complete enumeration of all C.S.A. collection activities. What is attempted rather in the paragraphs below is to present examples of how the organization operates in using each of these techniques.

Registration: As mentioned earlier there is required registration of vital statistics (particularly births and deaths and marriages), of internal migration, and of the rural population. There are occasional hints that these registrations are not always complete but that is hardly surprising in such an immense country.

<sup>5</sup> *Vestnik Statistiki*, No. 6, 1951, p. 30.

<sup>6</sup> *Ibid.*, No. 2, 1952, pp. 10, 16-17.

<sup>7</sup> *Slovar-Spravochnik* . . . , *op. cit.*, p. 29.

<sup>8</sup> *Bolshaya Sovetskaya Entsiklopediya*, *op. cit.*, col. 749.

<sup>9</sup> *Ibid.*, col. 757.

<sup>10</sup> *Slovar-Spravochnik* . . . , *op. cit.*, p. 28.

Reports: A great variety of reports is required of Soviet enterprises and other institutions so that operating control over them may be maintained by higher organs. These reports also go to the Central Statistical Administration which uses them to collect current data on production, costs, labor force and many related topics. Under the new statute governing bookkeeping in state enterprises, adopted in 1951, these enterprises must submit to the Central Statistical Administration monthly, quarterly, and annual accounting and balance sheet reports.<sup>11</sup> Four years earlier it had been reported that enterprises reported monthly on output in physical and value terms, number of personnel by categories of workers, utilization of working time, wages of personnel, the level and structure of production costs, etc. There are also daily and ten-day telegraphic reports submitted on the physical output of the most important products.<sup>12</sup> A similar system of reports is also, apparently, obtained from collective farms periodically.

Censuses: As used here, the term census means usually the effort to obtain complete national inventories of particular types of goods. There has apparently been no census of population since 1939. Censuses, or inventories, are obtained by collection of reports from enterprises and farms either annually or at irregular intervals, the reports being checked by spot enumeration which, in theory, concentrates on actual counting of physical items available.

The Soviet government apparently conducts annual censuses of stocks of the most important materials, machinery and equipment, farm livestock, small scale production, and labor force, among others. In the decade ending with 1950, the C.S.A. carried out 170 censuses of equipment and materials, 100 of them during World War II, of which the largest number dealt with metal stocks.<sup>13</sup>

Sample Surveys: The only major example of a sample survey found in the literature examined for this paper was the continuing study of family budgets, an area of work whose beginnings under Soviet rule go back to 1919. At the present time apparently the budgets of 23,000 workers and 29,000 collective farmers are followed intensively, the families involved keeping records of incomes and expenditures and being visited at least twice a month by statistical workers who collect the data and check to make sure that records are kept. In picking workers or employees, there is apparently stratification by branch of industry, size of plant, average wages, and degree of skill. Collective farmers are selected after stratification according to area, type of farm, amount of income distributed by farm, number

of labor days earned, and the size of private garden plots. In discussing how subjects for study are selected there was no mention made of any randomization procedures or of any investigation of sampling error. Here, as elsewhere, the literature studied showed little awareness, or perhaps interest is better, in modern sampling theory or other complex and refined techniques of contemporary statistical work as practiced in the west.<sup>14</sup>

#### CHECKING OF DATA

Checking of data to assure its accuracy has a unique importance in statistical work in the Soviet Union; to find an equivalent phenomenon in this country one has to turn to the work of the Internal Revenue Bureau here in checking income tax returns for corporations and individuals. Errors of copying, calculation, and the like, of course, are no respecters of political or economic systems. But much more important sources of errors in Soviet data arise from the fact that virtually everyone reporting economic data to the C.S.A. has, or at some time may have, the temptation to benefit from false reporting.

In his interviews with refugees who were formerly Soviet economic officials in that country, Joseph Berliner found evidence that a basic principle of Soviet managerial behavior is "simulating successful performance by a variety of deceptive practices."<sup>15</sup> The volume of complaints in the Soviet press, including the technical statistical organs studied for this paper, indicates clearly that one of the basic forms of such deception is deliberate falsification of statistical reports. Perhaps the most open admission of the wide extent of such falsification came in 1947 when the Soviet crop government announced the formation of a completely new national crop inspection system in order to check the widespread overreporting of acreages and underreporting of harvests which had taken place in 1946.<sup>16</sup>

During 1951 and early 1952 the official organ of the Central Statistical Administration, *Vestnik Statistiki*, was full of denunciations of statisticians who accepted reports from industrial and farm enterprises without the most careful checking and physical inventORIZATION. From these complaints, many of them voiced at statistical conferences devoted to self-criticism, it was clear that Soviet entrepreneurs engage wholesale in concealing the extent of their stocks of materials, in padding their production figures, and similar misrepresentation. Time and again the statistical workers have been told that they must end their "liberal," and "conciliatory" attitudes toward such falsification, that they

<sup>11</sup> *Vestnik Statistiki*, No. 6, 1951, p. 30.

<sup>12</sup> *Bolshaya Sovetskaya Entsiklopediya*, op. cit., col. 754.

<sup>13</sup> *Vestnik Statistiki*, No. 5, 1951, p. 5.

<sup>14</sup> *Vestnik Statistiki*, No. 6, 1951, pp. 19-27.

<sup>15</sup> Joseph Berliner, "The Informal Organization of the Soviet Firm," *Quarterly Journal of Economics*, August 1952, p. 355.

<sup>16</sup> Harry Schwartz, *Russia's Soviet Economy*, New York, Prentice-Hall, 1950, p. 311.



must overcome the "localistic" tendencies which cause such criminals to be hidden, and that they must report to the appropriate prosecuting and police officials all such cases they find. The overall impression given by the volume and sharpness of these comments is that the quality of Soviet statistics is poor because a substantial amount of falsification is not eradicated even from the secret reports reaching the highest authorities. The percentage error introduced into the data by such falsification cannot be estimated. It probably varies from one area of the economy to another, and may be highest in agriculture which, as the most dispersed section of economic life, is the most difficult to check.<sup>17</sup>

Indicative of the lengths to which the Soviet government must go to prevent false reporting and theft is the 1951 order that every collective farm animal must be branded with a separate number so as to facilitate accounting and also to prevent collective farmers from exchanging their own poorly fed livestock for well fed collective farm animals. In addition no report that an animal has died of natural causes is to be accepted unless the animal's corpse has been checked by a veterinary or a bacteriological laboratory and the animal's demise has been considered by the collective farm administration.<sup>18</sup> Presumably this last measure is intended to check the practice of killing collective livestock for meat to be consumed by the farmers and the writing off of such animals as having died from natural causes.

In addition to deliberate falsification, the quality of Soviet statistics apparently also suffers severely from the low level of ability and the inadequate training of many statistical and bookkeeping workers. Many untrained workers are apparently employed by C.S.A. at the local level; many of those who graduate from the 8 month training courses given to prepare C.S.A. *raion* inspectors cannot be employed for lack of ability; in trying to check machinery and other data work is hampered by lack of technically trained people knowing these fields; poor living conditions of field workers make for appreciable turnover of personnel which is most serious in the case of highly trained personnel.<sup>19</sup>

#### CALCULATION AND TABULATION<sup>20</sup>

X One of the most important trends in Soviet statistics in recent years has been the rapid pace at which mechanical equipment for calculation and tabulation has been introduced. Although the beginnings of this

<sup>17</sup> On the importance of deliberate falsification of Soviet statistics cf. the following partial list of references in recent issues of *Vestnik Statistiki*: No. 2, 1951, pp. 91-2; No. 5, 1951, p. 13; No. 6, 1951, pp. 82-5; and the entire lead editorial in No. 2, 1952.

<sup>18</sup> *Vestnik Statistiki*, No. 6, 1951, p. 14.

<sup>19</sup> *Vestnik Statistiki*, No. 5, 1951, pp. 53-4, 63; No. 6, 1951, pp. 84, 92.

<sup>20</sup> This section is based on the unusually informative article in *Vestnik Statistiki*, No. 2, 1952, pp. 65 ff.

movement may be traced back at least to the 1930's, even five years ago apparently the volume of manual work, supplemented by the use of simple instruments such as the slide rule and the abacus, was overwhelming. But in recent years the production of adding machines, calculators capable of multiplication and division, and of punch card equipment has increased rapidly so that such equipment is apparently now often available at the points in the economy where the greatest of numerical accounting or statistical work must be done.

The large scale use of calculating and related equipment is apparently organized as follows: Small and medium enterprises of less than 3,000 employees, as well as State Bank branches and other institutions, have Machine-Accounting Bureaus with adding, calculating, billing and bookkeeping machines employed. Larger enterprises, the regional offices of the State Bank, and the like have larger Machine Accounting Stations which may have punch card equipment as well as the simpler machinery listed for the Machine-Accounting Bureaus. The Central Statistical Administration itself has "Factories of Mechanized Accounting" where punch card equipment handles the large census and survey tabulation and summarization work. At the local level of C.S.A. operations, however, it is said that adding and calculating machines are now only "beginning" to be introduced. In these "Factories of Mechanized Accounting," it is claimed, national censuses of materials can be carried to the point of at least preliminary results available in two or three weeks, if telegraphic totals come from the field.

Illustrative of the speed which is now said to be possible, a recent national census of tractor spare parts, involving 20,000 respondents and 20,000,000 calculations, was carried out within six weeks.<sup>21</sup> On the less cheerful side, it is complained that the construction of Soviet statistical machinery still requires improvement, while much of the punch card equipment is still inadequately employed.

#### SOME CONCLUSIONS

Against the background presented earlier some tentative conclusions may be offered, though it should be remembered that the volume of evidence available is limited. This writer would feel on much stronger ground in offering these conclusions if American statisticians had the opportunity freely to meet with their Soviet counterparts and discuss common problems, and also if we had the opportunity to study the Soviet statistical system at first hand.

First, it seems clear that the Soviet Union does have a comprehensive and complex statistical apparatus which does provide a vast volume of data permitting

<sup>21</sup> *Ibid.*, p. 68.



the planners and administrators to do their work. This apparatus is still plagued by an inadequate number of trained people and by the difficulties arising from inadequate mechanization at the grass roots, but both of these are matters on which progress has been made and on which future progress should be made.

Second, the key problem of Soviet statisticians probably arises from the fact that the nature of the Soviet systems creates systematic and widespread temptations for respondents to supply false information. While Soviet statistical authorities can undoubtedly improve their work of unearthing such false information and diminishing its effect on the accuracy of their data, there would seem reason to suppose that a persistent margin of error exists in Soviet data arising from falsification at the grass roots. This would seem to be most serious, from our point of view, insofar as it leads to exaggerated production data which are then taken by foreigners as basic data in evaluating Soviet strength. It seems unlikely that such falsification is so great as to change the order of magnitude of such key indicators as, say, steel production — unless there is deliberate

falsification at the highest Soviet level — but the falsification may be enough to require a 5 or 10 per cent deduction from announced or implied Soviet output data. The falsification can be done away with entirely only by radical changes in the Soviet system, changes comparable in magnitude to those that would be required in our income tax laws to do away with all or most falsification in income tax returns here.

Third, the evidence suggests that on the whole Soviet statistical techniques are less advanced than those in the western world and that modern developments in the fields of sampling theory, correlation analysis and the like are used only slightly or not at all. Certainly little interest in such matters is evidenced in Soviet statistical textbooks and in the journal of the Central Statistical Administration. That this should be so, if it is so, is surprising in view of the great contributions made in the past by Russians in the field of probability and statistical theory. It can only be explained on the basis of the dead hand that totalitarian ideology and Stalin worship impose upon Soviet statisticians as they do upon creative work in many other fields.

## THE NATURE OF SOVIET POPULATION AND VITAL STATISTICS

by FRANK LORIMER<sup>1</sup>  
American University

The only problems that arise with respect to early Soviet statistics on population are purely technical questions about the accuracy of scientific findings — as in the case of population studies in the United States. Those in charge of official investigations at this time had been trained in bourgeois scientific methods, and continued to follow these principles. The government welcomed scientific inquiries, and published complete results — being confident that the cumulative record would exhibit the triumphant progress of a new society.

The All-Union Census of 1926 was an outstanding achievement of this early, optimistic period. It provided information on a wide range of demographic, economic, and cultural characteristics. The data were analyzed in depth to yield highly significant results and were published in full detail. These results, as cross-checked, are found, in general, to be quite reliable. But, as might be expected, there are serious inaccuracies in the classification of population by age, and

on some other topics, due to the illiteracy of large parts of the population. Unfortunately, irregularities in age classification caused by erroneous reporting were superimposed on irregularities caused by previous catastrophes, so that major errors cannot be smoothed out. All later population projections, based in part on the 1926 age data, are somewhat distorted by these initial errors. Nevertheless, the published results of the 1926 census represent a contribution to scientific demography that is as yet unequalled in many countries, and that has not been matched by any later achievement of the Soviet government in this field.

A new civil registration system was introduced in place of the cumbersome and incomplete ecclesiastical registers. The new system was sufficiently well established by the middle 1920's to provide data on fertility and mortality in areas having about 78 percent of the total population of the Soviet Union, and the system was constantly extended. It must, however, be recognized that civil registration at this time was quite imperfect. The census provided an alternative base for quiet reliable estimates of fertility, but errors in information on mortality were more serious. Registration

<sup>1</sup> The author is indebted for critical information bearing on many points in this paper to a respected colleague who prefers to remain anonymous. The author is solely responsible for all statements and interpretations.

of deaths seems to have been less complete than registration of births as in some Balkan countries. A field test in rural parts of the Leningrad region in 1926-27 indicated an omission of only 2.5 percent of deaths, but examination of mortality data for some of the outlying parts of the registration area suggests much greater deficiency. Moreover, mortality was undoubtedly higher in regions outside, than in regions within, the registration area. My estimate of mortality in 1926-27 for the whole USSR gives a crude death rate about 28 percent above that indicated by registered deaths within the registration area.<sup>2</sup> This adjustment is subject to a large error, but it is certainly in the right direction. In any case, the mortality statistics of this period were used, with only slight adjustment, by Novoselskiy and Payebnskiy to produce a series of regional life tables — the last life tables ever published under Soviet auspices.

Current estimates of net migration to cities were derived from registration of arrivals and departures. Such estimates tended to have an upward bias, because registration of arrivals was more complete than that of departures.

Prospects for the provision of increasingly comprehensive and reliable information on the population and vital trends of the Soviet Union appeared bright until about 1930. Thereafter this progress was eclipsed by a spreading cloud of anxiety and secrecy — with resultant deterioration, as we shall see, in the quality of demographic information used by Soviet statisticians in planning operations. Changes in the organization of statistical work and in terminology suggest increased emphasis on information directed toward, and in some cases derived from, administrative processes, in contrast to more abstract and comprehensive information associated with "bourgeois" conceptions of science.<sup>3</sup>

The first clear indication of an ominous trend in official information on the Soviet population was the suppression of regular detailed reports on vital statistics. The last report in this series, prepared under the old Central Statistical Board, for the year 1926, was published in 1929. Vital statistics by administrative divisions in 1927 were, however, included in a comprehensive statistical compendium for the year 1928. Vital statistics for the Ukraine were continued through 1928, the last report being published in 1932. Gosplan henceforth suppressed all publication of detailed vital statistics, and for a long time it suppressed all information on this subject. There can be no doubt that this drastic action was motivated chiefly by anxiety to conceal the excess death of several million people during the forced collectivization of agriculture and asso-

ciated disorders (as shown by intensive analysis of later official information). It is also true that civil registration was for a time seriously disordered by these calamities.

The accounting division of Gosplan produced a grossly erroneous estimate of the current trend of the Soviet population during the 1930's. The text of the Second Five-Year Plan, published in 1937, gave 165.7 million as the population of the USSR, January 1, 1933, with an expected increase to 180.7 million by January 1, 1938. This trend projected over another year to the time of the 1939 census gives an excess of 13.5 million above the census figure. The major error must have been in the base figure for 1933, and in the estimated increase from 1933 through 1936, because 1937 and 1938 were years of high natural increase. This reveals inherent weakness in the official demographic statistics at this time. As already noted, it is probable that the statistics on mortality were defective to a degree not recognized by the Gosplan accountants. Again, the statistical officials responsible for preparing the population estimates may not have received accurate information on catastrophes (especially in remote regions like Kazakhstan) and dared not take rumors of such events into account. Furthermore, we now know that births or deaths in special populations under control of the NKVD were not included in the regional vital statistics at this time, and may never have reached the Gosplan officials in Moscow. The withholding of useful information in the possession of one government agency from other agencies has occurred in other countries; it may have been a major obstacle to the development of reliable statistics in the Soviet Union. Another condition contributing to this statistical fiasco may have been the removal of imaginative, independence scientists from positions of responsibility in the Soviet government, or their subordination to political opportunists.

The most spectacular act of suppression in the field of population statistics was the repudiation of the All-Union Census of 1937, and the execution of the officials chiefly responsible for its direction. Some of the results of the 1937 census may have been unsatisfactory to the top Soviet officials; and the subsequent census was revised in some details. Yet I doubt that the Soviet leaders would have invoked such a drastic procedure for such trivial advantages, because unwelcome information could have been left unpublished. It seems more likely that the large discrepancy between the number of persons counted in the census and the number expected on the basis of the inflated current estimates — a discrepancy that must have been in the vicinity of 10 million — was really interpreted by the Politburo as evidence of inefficiency or sabotage. This theory receives support from the great effort made to

<sup>2</sup> Lorimer: *Population of the Soviet Union*, 113-119.

<sup>3</sup> Article by Schwartz in this series.

obtain completeness of enumeration in 1939. We know that the confidential tabulation of the 1937 census data was continued after the census had been publicly denounced — but this may have been merely to obtain tentative data on various topics of immediate interest to the government.

The treatment of the 1939 census reveals the anxiety of Soviet officials to select items of information deemed "fit" for publication. The peculiar device of publishing information on age only by broad classes without sex, and on sex only without age, was obviously designed to conceal irregularities in age composition due to catastrophic events in the early 1930's, and the shortage of adult males which had become even more acute than in 1926. Data for political divisions were never published; such information would in some cases have revealed very abnormal conditions. Again, the 1939 census data on labor force and classification by industry were never published. As Bergson, Eason, and others have pointed out, there is a peculiar discrepancy between the total labor force indicated by an analysis of the 1939 population and any plausible summation of reported numbers and estimates of persons occupied in various recognized branches of Soviet industry.<sup>4</sup> The Soviet government apparently did not wish to emphasize this discrepancy, or to explain its nature.

We can assume that by 1939 the Soviet government had in its possession reliable and detailed secret information on population and vital statistics — except that the latter may still have been somewhat biased by incompleteness of registration in some areas, and perhaps by the continued withholding by the NKVD of vital statistics for special populations under its control.

The flow of reliable information was soon disrupted by war. Civil registration broke down in the occupied areas and registers were burned. The population in many other districts was swamped by the in-movement of migrants, and normal official activities were disrupted by emergency needs. Yet the need for current information on population was urgent for the allocation of essential supplies and the mobilization of labor. It was, therefore, necessary to improvise an emergency system of demographic statistics. Previous schemes and methods were reworked to meet the needs of the emergency.

On July 8, 1939, the Council of Ministers had decreed that the planning and regulation of labor forces was the "central task" of the planning commissions

of republics, territories, *oblasts*, and *raions* (counties)<sup>5</sup> Instructions and forms for computing labor force balances for 1939 and 1940 were sent by Gosplan to the local planning commissions of republics, territories, and *oblasts* in August of that year. The commissions were instructed to submit reports of such labor force balances to the Gosplan accounting division. Various sources of statistical information were specified. The results of this experiment, however, were rather disappointing. Many of the local commissions did not submit reports at all. The reports submitted by other local commissions were infected with errors. Mistakes were made in transforming *kolkhoz* "labor-days" (varying according to productivity) into man-days and labor force personnel. Seasonal labor led to further complications. In addition to confusions of this kind, a definite trend was observed toward exaggerating local labor requirements and minimizing local labor resources. Nevertheless, during the next few years, including the first war years, local planning agencies were held responsible for reporting labor force balances.

Gosplan directed an impressive series of special investigations during the war years. These included both quick and complete enumerations of particular segments of the population and special surveys with locally controlled purposive sampling. Incidentally, it may be noted that, although probability sampling has been highly developed in agricultural investigations in Russia, it does not seem to have been used in demographic studies. The quick or "short" enumeration had two distinct characteristics. (1) it is limited to a few items of information that can be handled by local investigators without special training or elaborate instructions; (2) the results are transmitted directly, frequently by wire, from *raion* or establishment offices to the central accounting agency.<sup>6</sup>

The Gosplan investigations included a quick enumeration of family dependents (March, 1942), of unemployed persons in cities (February, 1943) and of the evacuated population. A nation-wide quick enumeration of the population in cities of the Soviet Union was also carried out during the war — thus setting the pattern that has been followed in later years. A series of population reports from rural *raions* as of January 1 of each year was begun in 1944, and has been implemented in recent years by an important innovation.<sup>7</sup> The data used in the rural reports were

<sup>4</sup> Bergson, A., "A Problem in Soviet Statistics," *The Review of Economic Statistics*, 29:234-42, 1947.

Eason, Warren, "Trends and Prospects of the Soviet Population and Labor Force" (Arden House Conference on the Economy of the Soviet Union, 1951; to be published, Columbia University Press).

<sup>5</sup> Babynin, B., M. Sonin, and S. Trubnikov, "Protiv mestnicheskikh tendentsii v planirovanii rabochey sily," *Planovoye khozyaystvo* (Planned Economy), 1940, 4, pp. 58-67.

<sup>6</sup> Boyarskiy, A. Y., and P. P. Shusherin, *Demograficheskaya Statistika*, pp. 204-205.

<sup>7</sup> *ibid.*



apparently drawn at first from village inventories of household accounts. Provision was also made for annual reports on local labor requirements, thus supplying to Gosplan the information needed to assume primary responsibility for computing labor force balances for republics, territories and districts. This program undoubtedly provided some useful current information during the late war years and early post-war years on the distribution of the population, but the information must have been incomplete and inaccurate.

It is apparent that by 1947 there was dissatisfaction in high administrative echelons with the information obtained in this way. Responsibility for the basic data rested on a host of minor officials, many of whom are deficient in clerical skills and who are already burdened with many tasks, and on the cooperation of a large, shifting, polyglot population scattered over an immense area. People who are constantly subjected to regimentation find many ways of evading compliance, as evidenced by the high labor turn-over in Soviet industries.

A program for a comprehensive census to cover population, housing, agriculture and other subjects had been discussed by Soviet statisticians in 1942.<sup>8</sup> There can be little doubt that such a program was again given serious consideration in the postwar period but, so far as the writer knows, there has been no mention of this in the Soviet press. Boyaskiy, in the 1951 edition of his treatise on Demographic Statistics, criticizes the information provided by quick enumerations as both unreliable and incomplete, and insists on the necessity of a comprehensive census.<sup>9</sup> But this eminent statistician had already been openly criticized by politically more powerful colleagues as failing to comprehend the true nature of Marxist science and as exhibiting a bourgeois preference for mere statistical investigations as a means of discovering truth.<sup>10</sup> It is unlikely that his views carried much weight in official circles.

✕ An alternative plan designed to yield reliable current information on population was inaugurated by the decree of August 10, 1948, which provided for the reorganization of statistical operations in the Soviet government.<sup>11</sup> This new program for population statistics came into effect with the 1949 quick enumerations. It provided an annual classification of whole

urban and rural population by sex and age. The selected age classes are as follows: single year classes from 0 through 19; 10-year classes, 20 through 49; 5-year classes, 50 through 59; a terminal class, 60 years and over. This classification appears most appropriate for the calculation of expected increments to the labor force, educational needs, and labor reserves and it might also be used in calculating age-specific death rates.

Apparently the enumeration of the urban population is carried out through a house-to-house census, presumably facilitated by use of the registration records of house occupants kept by each building superintendent. But the data for the rural population are drawn from new rural household registration files, inaugurated in 1948, which are kept by the secretary of each village (sel-soviet), who also keeps the vital statistics of his community. These records cover all households, including those of collective farmers, workers and employees, coop-handcraftsmen, individual farmers, and others. These rural household books are described as a "unique source" for the data on population.<sup>12</sup> The secretary is required, in theory, to visit each household and to check the accuracy of the register before compiling the population report, though in practice this requirement may be satisfied by receiving calls from household heads.

The household books contain information on all members, including those temporarily absent, reported in separate categories. Conversely, persons temporarily living on the village territory are entered on a special register. The rural household records cover the demographic characteristics used in former population census schedules: (1) relation to the head of the family, (2) sex, (3) age, (4) nationality, (5) literacy, (6) for pupils: school and class, (7) specialty in agriculture and out of agriculture, (8) place of work and job, (9) social group.<sup>13</sup>

The comprehensive nature of the entries in the rural household records suggests that eventually they may be used for investigations of economic and social characteristics. This might be done (1) through supplementary surveys, perhaps on a sampling basis, (2) through extending the scope of information required in the annual reports, or (3) through periodic censuses of the classic type. The first of these procedures seems to me to be that most likely to be followed in the immediate future.

In my judgment, the program in force since 1949, in spite of its limitations, is now providing Soviet officials with reasonably reliable current information on the

<sup>8</sup> I. U. Pisarev, *Metodologicheskie Voprosy, vytekayushchie iz opyta vsesoyuznoy Perepisi, Naseleniya 1939 goda. Referaty i Annotatsii Dokladov po statistike*. Akademiya Nauk SSSR. Moskva, 1949, pp. 13-16.

<sup>9</sup> Boyaskiy and Shusherin, *loc. cit.*

<sup>10</sup> Soviet Views on Post-War Economy (Translation by I. Gruliov of transcript of discussion in Moscow, May, 1947). Public Affairs Press.

<sup>11</sup> *Vestnik Statistiki*, 1949, no. 1, pp. 1-6.

<sup>12</sup> Kakie Mery neobkhodino prinyat dlya uluchsheniya ucheta v sel skikh sovetakh, *Vestnik Statistiki*, 1950, No. 1, pp. 65-70.

<sup>13</sup> Zhuikov, G. C., *Uchet v sel skikh sovetakh*, Moscow, 1951, pp. 12-13.

population of the Soviet Union, in complete geographical detail, and with a detailed classification by age as well as by sex. These officials must also have at their disposal reasonably reliable and detailed vital statistics.

Continued refusal by the government of the USSR to provide demographic information to the United Nations, as eloquently evidenced by large blank spaces in the *Demographic Yearbook*, could, therefore, be interpreted only in one of three possible ways: (1) indifference to the social ideals of the United Nations charter, (2) subordination of social ideals to concern with military security to a degree beyond that of any other civilized nation, or (3) the presence of unhealthy conditions, such as abnormal sex and age composition or the persistence of high mortality rates which the Soviet government is unwilling to reveal.

We can now formulate some principles concerning the reliability and usability of Soviet reports on population and vital statistics. The first aspect of this problem concerns the accuracy of information in this field available to Soviet officials. We may refer to this as the problem of "technical reliability." A second aspect concerns the "fidelity" of published reports relative to the available information. These two problems, though distinct, are not unrelated; they must be treated in conjunction. The first aspect requires special emphasis, because some scholars have been so obsessed with the problem of fidelity that they have used information from Soviet sources with unwarranted confidence, subject only to reservations on the question of fidelity.

We have seen that demographic statistics in the Soviet Union attained a reasonably high level of technical reliability in three brief periods: the middle and late 1920's, the late 1930's, and recently, say, since 1949. But all releases on population from official Soviet sources during the last twenty years have been selected items of partial information. These releases vary in character and utility. Some are precise reports of official findings, such as selected items from the 1939 census, or the birth rate in 1938. Others are vague pronouncements designed to create a certain impression, such as the statement that there is "no unemployment" in the Soviet Union, or Beriia's assertion that the death rate in a recent year was "half" that of the pre-war period, which have no arithmetic value. There are, of course, many intermediate types between these extremes, and it is not always easy to classify a particular release in this respect.

This problem is well illustrated in the case of the famous statement by Alexandrov, Chief of the Propaganda Division of the Communist Party, in January, 1946, that there were 193 million persons in the Soviet Union, of whom 100 million had been born since the revolution. It was common practice in the Soviet Union at this time to use the 1939 census figures for Ukraine and Byelorussia, plus pre-war numbers in the annexed

areas, as the current population of these republics, and the same procedure was sometimes followed in referring to the whole population of the USSR, giving the figure 193 million. Alexandrov's statement was assumed by some scholars to be drawn from a precise statistical observation which included an age classification of the population. The figure is solemnly reproduced in the *United Nations Demographic Yearbook* as the one available datum on the post-war population of the USSR. Perhaps this interpretation is correct; but an alternative interpretation is at least equally plausible. His intent was to indicate the magnitude of the Soviet population as a factor in its world position, and to emphasize the fact that a large share of this population has grown up under Communism. In this sense, the use of a current approximate figure on population and a rough calculation of the proportion born after the revolution was quite valid—the precise values being something of the order indicated. In that case the outside world knew just as much about the Soviet population after this statement as before. The only utility of such a figure to a statistician is that it permits him to state a sensible guess in the form of a quotation, with proper documentation to a Russian text.

On the other hand, the recent statement by Mrs. Speranskaya to the Third Committee of the U. N. Assembly, December 8, 1952, that "the net increase of the population of the USSR in the past three years has been 9.5 million," though merely the statement of an increment, has apparent reference to a statistical finding. This figure is reasonable, being in fact rather low in the light of prewar trends in fertility and mortality. Nevertheless, we must entertain some reservation about its technical accuracy. In view of probable improvement in statistical reporting during this period, the estimate of increase might have been slightly inflated. Reference to such possible bias, or correction for bias (in cases where an error tends to support Soviet claims) would require a level of truthfulness that is never demonstrated in Soviet releases. I do not seriously question the approximate accuracy of this particular figure as quoted, but the question illustrates an important principle.

The distinctions between *reportorial fidelity*, *abstract fidelity to science*, and *technical accuracy*, can be more clearly stated by reference to an officially reported death rate in the USSR in 1935: 16.3 per thousand.<sup>14</sup> Assuming reportorial fidelity, we need to ask: To what area does this figure apply—the European part of the USSR, some more extensive registration area, or the whole Soviet Union? Again, assuming that the reported number of deaths was related to the current estimate of population (presumably in the case of the whole

<sup>14</sup> Kraval, I., "Vsesoyuznaya Perepis Naseleniya 1937," *Plannoye Khozyaystvo*, 12:24, 1936.



USSR 173.2 million, the midpoint of Gosplan's five-year estimate for 1933-37), we now know that correction for the error in this estimate would raise the rate to a point somewhere in the vicinity of 17.5 per thousand. Finally, we must ask whether or not deaths in forced labor camps and other special populations were taken into account in computing the reported rate. The abstract fidelity of Soviet officials to science was not sufficiently powerful to provide any information on this point.

I have never found evidence that any sober official release on population or vital trends in the Soviet Union violates the principle of reportorial fidelity. We cannot be absolutely sure that this never happens; but all the available evidence supports the thesis that in most cases this principle is rigorously respected. But this is not enough to guarantee the reliability of the information as a basis of valid inferences. Even reportorially correct releases, if treated uncritically, can lead to fallacious conclusions. In some cases partial or ambiguous statements, though not literally incorrect, are consciously designed to promote such misinterpretation. In other cases, equally serious errors may result from technical inaccuracies in the basic data or its

analysis, of which the author may or may not have been aware.

There is no recent information on population or vital trends in the Soviet Union that can be accepted at face value as reliable in all the respects defined above. Nevertheless, there is an increasing volume of information that can be used to support reasonably reliable inferences. This material can be used to advance our knowledge about the Soviet population on three conditions, but only on these conditions: (1) There must be constant and intense investigation of the processes by which basic data are obtained and methods of analysis used by Soviet officials, and each datum must be examined in relation to the possible sources of its derivation. (2) Each item of apparent information must be examined with respect to its precise context. (3) The implications of various items of apparent information must be carefully developed and tested with respect to their mutual consistency. Those interested in obtaining really useful information on the population of the Soviet Union must expect to devote a large share of their energy to systematic research on the nature of the sources used in their inquiries.

## RELIABILITY OF SOVIET INDUSTRIAL AND NATIONAL INCOME STATISTICS

by ALEXANDER GERSCHENKRON  
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A good deal of work has been carried out in the last ten or fifteen years on the subject of industrial and national income statistics in Soviet Russia. Explicitly or implicitly, the problem of their reliability always has stood at the center of these studies. Anything I can say therefore within the short scope of the following pages must perforce be in the nature of restatement and reiteration. Since in my own work I have concerned myself primarily with industrial rather than income statistics, I may perhaps be forgiven for devoting most of my space to the former and confining myself to a few interjected remarks on the latter.

The problem of reliability of Soviet statistics has a good many facets. There is first of all the question of technical efficiency. Ideally, a number of questions ought to be answered under that head. How comprehensive are the Soviet statistics? How are they collected, reported and collated? There is then on a higher plane, the question of specific aggregate meas-

urements used in Soviet Russia. And there is, finally, the great and overriding question of deliberate and wilful distortion and falsification both of basic statistical data and of aggregate measurements.

I have said before that a good deal of work has been done on the subject. Nevertheless I do not believe that the conclusions reached can be stated in categorical form. Rather, they must be couched in the language of probabilities and impressions.

First as to the comprehensiveness of Soviet statistics. My impression is that Soviet industrial statistics are comprehensive indeed, more so than comparable statistics of most other countries. This is implicit in the nature of the Soviet system of strongly centralized planning. The system of continuous rather than intermittent reporting extends to all or nearly all branches and enterprises of industry, and the basic data refer directly to output rather than to indirect measurements of output such as working time, machine time,

or raw material inputs. The character and the quantitative scope of these data are doubtless impressive. The quality of these statistical data is another matter.

The very comprehensiveness of Soviet statistics is bound to detract from their quality. In conditions of what after all still is a relatively backward country with a short history of mass literacy, many a figure reported to the central authorities is liable to be inaccurate simply because of ignorance and incompetence. In addition, low standards of honesty in economic affairs are in general peculiar to economic backwardness. There is little doubt that, historically speaking, Russia achieved great progress in this respect between the emancipation of the peasants and the outbreak of the First World War. But within the specific institutional setting of the Five Year Plans with its pressures the temptation for statistical dishonesty is great. From all we hear from conversations with D.P.s, we must assume that there is a general tendency to exaggerate the results and report data on output higher than corresponds to reality. This seems to be the case even within the industrial enterprises as the product moves from workshop to workshop, from one stage of processing to another. The pressure to show fulfilment of planned targets is bound to have that effect.

But on the other hand, there seems to be also some tendency in the opposite direction. The Soviet economy is a "deficit" economy. Once the plan is fulfilled, there is great temptation not to report excess production fully, to build up stocks, on the one hand as a reserve, as an insurance against unforeseen contingencies in the following period and also, no less important, for various illicit manipulations such as barter dealings with other firms designed to assure supply of scarce materials and/or to confer special benefits on those in charge of industrial enterprises. This tendency to understate is no less real than the tendency to overstate. Both are inherent in the very nature of industrial enterprises in Soviet Russia. Whichever of the two is the stronger one in terms of reported output must vary from branch to branch, from enterprise to enterprise. It should be noted also that the enterprises do have a say in determining planned targets and that, with a few exceptions, they are trying to exert their influence to see these targets reduced in order to diminish the pressure and make more probable fulfilment and overfulfilment of plans and attainment of rewards and promotions which follow in the wake of such achievements. Under these conditions, the net effect on output statistics becomes a matter of conjecture. All that can be done is to recognize that industrial statistics tend to be vitiated by dishonesty and that the chance that the opposing forces would exactly balance each other is, of course, a small one.

This situation doubtless affects the absolute values

of industrial output as reported to the authorities. Does it also affect the index of industrial output, i.e., the rate of change? In other words, can we assume that the vitiating tendencies exercise their effect with the same relative force from year to year. It would seem that the answer should be in the negative. Much of Soviet economic life is characterized by a curious cycle: the amount of pressure to which the enterprises are exposed, the degree of freedom which is accorded to the managers of enterprises tend to fluctuate. Torn between the desire to control absolutely and the recognition that unless some sphere of freedom is granted, managerial activities become impossible, Soviet policies move back and forth uneasily. These fluctuations are bound to affect the nature of statistical reporting and the relative change in the resulting index series.

On the level of aggregate measurements there is of course the oft-told story of the Soviet index at 1926/27 prices. There is no need to repeat the story here. There is no question that the 1926/27 index was a most unreliable gauge of growth of Soviet output during the long period 1928 - 1950. There is no question that it showed a greatly exaggerated rate of change.

The trouble, of course, was the method of valuation of new commodities at inflation-swollen current prices rather than prices of 1926/27. That index was bad indeed. Even though I have done a good deal of work on that index, new and quite surprising inadequacies still keep coming to one's attention. Thus, to give an example, one would assume that an old industry like the coal industry with its fairly homogeneous product was free from the specific upward bias. But that is not so. It appears that in coal mining output of new mines was valued at current prices, so that even there, despite absence of new commodities, the 1926/27 ruble was far from being a constant magnitude. Beyond that I must confine myself to two comments.

(1) While the aggregate index of Soviet industrial growth was quite unreliable, the Soviets did publish sufficient quantities of additional material which made it possible to replace the 1926/27 indices by much more reliable indices. As a result, we have now N. Jasny's index based on corrected 1926/27 prices and Donald Hodgman's index based on value added weights of 1934.\* Thus, at least for the past, the situation with regard to aggregate measurements differs from that with regard to reporting of basic data. The former lent themselves to rectification while the latter did not. In addition, of course, the fact remains that periods of rapid structural change present general index number problems which defy any perfect solution.

\* N. Jasny, *The Soviet Economy During the Plan Era*, Stanford 1951; Donald R. Hodgman, *A New Production Index for Soviet Industry*, Harvard Ph.D. Thesis, to be published in book form

(2) It must be added that the 1926/27 index seems to belong to the past, at least as far as measurement of industrial output is concerned. From 1950 on, gross output of industry in Soviet Russia apparently is reported at prices that were in effect on January 1, 1952. Prices used are the so-called "wholesale prices of enterprises" which do not include turnover tax. In addition, a fairly reasonable procedure for pricing new commodities has been evolved, which if actually followed in Soviet practice, should prevent the "new" commodities from distorting the index too much. The new index was recomputed back to the year 1950 in which year it was linked with the old 1926/27 index. It has been stated that no recomputation of the new index will be carried out for the years preceding 1950. This is easily understandable. Such a recomputation would show a rate of industrial growth for the past much below that which the Soviet public was taught to accept as correct on the basis of the old index. For the near future, however, the new index seems to represent a fairly reliable gauge of Soviet industrial growth. In fact, because of the strong reductions in prices of heavy industry products which took place since January 1950, and the probable reintroduction of subsidies on these goods, the output of which constitutes the most rapidly expanding component of total output, it seems that the new index may tend to understate rather than to overstate the rate of industrial growth. Soviet practice, guided as it is by propaganda interests, may indeed introduce new distorting elements into the index but for the moment it would seem that a much more reliable yardstick for measuring growth of industrial output has been introduced. It is however, not clear at all at this point whether the reform of the index extends to the other sections of the economy and on which basis calculations of national income proceed at present.

Perhaps a brief word on past national income statistics is in order at that point. It might be said that the output series that were regularly published by the Soviets were gross series, that is aggregative series based on quantity-price multiplications. The national income figures were published much less frequently in any detail. Such national income statistics as had been published labor under a conceptual deficiency: the Soviet concept of national income is essentially one of physical productivity and excludes most government, domestic, and professional services as well as passenger transportation. Much more serious, however, than the limited character of the concept is the fact that the degree of reliability of the national income series in the past was disastrously low. There are several reasons for that. As far as the inclusion of net industrial output in national income is concerned, the upward bias of the 1926/27 price weights doubt-

less assumed even greater proportions because it was the value added portion of prices of highly fabricated goods that must be considered as the very seat of the upward bias. Agricultural net output figures may be assumed to have shown not inconsiderable upward bias for reasons that are so well detailed in Dr. Volin's paper in this symposium, but the degree of bias must have been a good deal lower than in industry. On the other hand, both the net value of construction and the net value of trade as components of national income must be assumed to have been very considerably exaggerated. The reason must be sought in the fact that the conversion of cost of construction and retail trade values into constant prices of 1926/27 was carried out in a way which did not adequately eliminate the effects of inflation on current prices. The problem was thus related to that of industrial statistics, but while in the case of industrial output the Soviets could at least plead the extenuating circumstance of great structural changes and emergence of many new commodities, the trouble with construction and trade contributions to national income lies essentially in the use of very inferior statistical techniques. It is very difficult indeed to estimate the degree of the upward bias in Soviet national income statistics. All we have in this respect are Mr. Jasny's estimates which are admittedly crude. But it is of interest to note that Mr. Jasny came to the conclusion that in the case of the industry's contribution to national income in 1937 the official data exaggerate the true figure by eighty-nine percent; while the exaggeration for the aggregate national income is only insignificantly lower, amounting as it did to eighty-one percent. In the case of trade the exaggeration amounts to no less than 195 percent!\* These estimates are far from being absolutely conclusive, but they do tend to reinforce the view that the reliability of Soviet national income statistics is, at best, as low as that of industrial statistics.

It remains to say a few words on the third aspect of the reliability problem, the question of deliberate and willful distortion of the data not by industrial managers who are moved by fear of the central government, but by the government itself. That a dictatorial government, free of control by public opinion, could base its statistical information on sheer invention, is quite clear. For a number of reasons, which have been frequently stated in the relevant western literature I believe that such was not the case for the past. What is true is that great and ignoble efforts were made by the Soviet authorities to present the statistical data not only in an incomplete, but also in a most misleading way, in order to evoke the impression of greater than actual attainments. That a good deal of these presen-

\* Naum Jasny, *The Soviet Economy During the Plan Era*. Stanford 1951, p. 35.



tations fully deserved to be called falsifications is equally true. But what mattered from the point of view of reliability and particularly from the point of view of usability of these statistics is the fact that as a rule closer study of these statistics enabled western scholars to penetrate the crust of these falsifications and to place the data presented into proper perspectives. This was possible at all because Soviet figures were not sheer inventions, because as a rule each figure presented had meaning and significance and the difficult task of the analyst consisted precisely in finding out just what the figures in question meant and signified. The old 1926/27 index was certainly a case in point. It represented a greatly distorted picture of the actual development, but it was also the Soviet sources from which western scholars were able to learn of the distortions and to understand the true meaning of the index.

Why a government so ruthlessly bent upon propaganda effects and so little impeded by restraints imposed by veracity did not attempt a complete divorce between Soviet statistics and Soviet reality is a matter of conjecture. Perhaps as long as a fair amount of statistical information was being published it would have proved much too difficult to maintain at least some degree of consistency, and by the same token some measure of verisimilitude of the statistical material, so that figures based on sheer invention would have very quickly lost all propaganda value. But what-

ever the reason, the actual situation seems reasonably clear as far as the past is concerned. And it is especially curious that all the talk in Soviet Russia about using statistics not objectively but in the interest of the Communist Party—talk to which a very interesting article by Stuart Rice\* called attention—did not seem to change much in that situation.

But this does not mean that one can ignore such talk altogether. There is nothing to prevent the Soviet government from abandoning this practice. They may start issuing statistics which are based on nothing else except sheer inventions and they may do so at any time they please. And, one must add, there is perhaps no time for that like the present. The flow of statistical information has been so greatly reduced in Soviet Russia since the period of the thirties, that it is almost impossible, or at any rate much more difficult, to test the available information for its internal consistency. And on the other hand, the mechanics of cold war may make it appear particularly tempting to the Soviet government to apply the big lie technique to data showing their economic progress. This is a contingency which all those concerned with quantitative research on the Soviet economy must at all times keep in mind.

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\* Stuart A. Rice, "Statistical Concepts in the Soviet Union Examined from Generally Accepted Scientific Viewpoints," *The Review of Economics and Statistics* February 1952, pp. 82 et seq.

## SECOND CONFERENCE ON BUSINESS STATISTICS

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The Wharton School of the University of Pennsylvania, in cooperation with the American Statistical Association, will hold its Second Conference on Business Statistics on June 11 and 12. The topics to be discussed are Applications of Statistics to Production Scheduling and Control, Capital Outlay Planning, and Sales Forecasting. Each topic will be developed in a separate section limited to 25 or 30 participants. It is expected that those attending the Conference will select one of these topical sections and that not more than one representative of a firm will be in attendance for a given topic.

The Conference will consist of morning and afternoon sessions on Thursday, June 11 and a morning session on Friday, June 12. William G. Cochran, President of the American Statistical Association, will address the combined participants at a luncheon meeting on Thursday. Following the Thursday afternoon sessions, and preceding the dinner meeting there will be a cocktail hour to help the conferees get better acquainted. Rufus S. Tucker, Economist for General Motors Corporation, will preside at the dinner meeting at which Robert W. Burgess, Director, Bureau of the Census, will speak. Remington Rand will provide a slide showing of "Univac" following the speech. After the Friday morning session Dean Balderston will address the conference at its final luncheon meeting and the moderators will give summaries of their separate topical sessions.

Programs and registration blanks will be mailed early in May to members of the Business and Economic Statistics Section who live in the Northeastern United States.

## REPORT OF ASA REPRESENTATIVES TO THE SOCIAL SCIENCE RESEARCH COUNCIL

We, as representatives of the ASA on the Board of Directors of the Social Science Research Council, report briefly on those activities of SSRC now under way, which may be of particular interest to the members and Board of Directors of ASA. More detailed information may be obtained from the annual report of the SSRC, which is available on request to the Council office, 230 Park Avenue, New York 17, N. Y.

We shall report on the activities concerning statistics under several headings.

### A. *Census Monographs*

The SSRC established a committee in 1950 under the chairmanship of Ralph G. Hurlin of the Russell Sage Foundation to encourage the preparation of a series of analytical monographs based primarily on the data of the 1950 census, and to assist the Bureau of the Census in planning and promoting their preparation as a part of the Bureau's program. The committee, working in close cooperation with the Bureau, has arrived at a list of 21 topics for monographs. Definite arrangements have been made for the preparation of some of the monographs. Others are in various stages of negotiation. The committee will continue to serve in an advisory relationship with respect to this program until it is completed.

### B. *Measurement of Opinion, Attitudes and Consumer Wants*

A committee on problems in this area was established on this subject in 1945, under the chairmanship of Samuel A. Stouffer of Harvard University, which is joint with the National Research Council. Three projects have been sponsored by this committee. One is a study of sampling methods used in this field, which is under the direction of F. F. Stephan of Princeton University. A second study deals with the measurement and control of interviewer effect and is directed by Clyde Hart of the National Opinion Research Center. A third study, under Paul Lazarsfeld of Columbia University, is concerned with a study of panel methods in survey work. These three studies are all nearly completed.

### C. *Scaling Theory and Methods*

A committee was appointed in December 1951, with Harold Gulliksen of Princeton University as its chairman, to review the status of research on psychological scaling theory and methods and to make plans for further basic research in this field. A monograph on scaling is being prepared under the direction of this committee.

### D. *Mathematical and Statistical Training of Social Scientists*

During the past two years the SSRC has been interested in the problem of improving the mathematical

and statistical training of social scientists. In the summer of 1951 SSRC sponsored a seminar on mathematical models in the theory of learning under the direction of Frederick Mosteller of Harvard University. In the summer of 1952 it sponsored a seminar concerned with the preparation of material for the mathematical training of social scientists. This seminar was conducted under the direction of William G. Madow of the University of Illinois.

Recently, the SSRC has approved an extension of this activity and has established a committee under the chairmanship of Professor Madow to take responsibility of this development. In particular, a plan for holding summer institutes on mathematical training for social scientists in 1953 and 1954 have been approved, and this activity will be carried out under the auspices of this committee.

### E. *Fellowships and Grants-in-Aid*

The SSRC has the following programs in the area of fellowships and grants-in-aid, each of the programs being administered by a separate committee:

(1) Faculty Research Fellowships. These fellowships are designed to enable young social scientists to devote at least half of their time to their own research while remaining in residence at their own institution and carrying on restricted amount of teaching.

(2) Research Training Fellowships. These fellowships are awarded at both pre-doctoral and post-doctoral levels to outstanding young social scientists.

(3) Grants-in-Aid. These grants are available to assist members of staffs of institutions which are without extensive resources for research in the social sciences.

### F. *Other Activities*

Other activities of varying degrees of interest to the members and Board of Directors of ASA are in the following fields:

- (1) Labor market research.
- (2) Migration differentials.
- (3) Social statistics.
- (4) Social behavior.
- (5) Social stratification.

We feel that SSRC is doing an extremely effective job of stimulating research and contributing to the development of high quality research personnel in the various social sciences. We are particularly gratified by the manner in which social statistics and statistical methodology are integrated into this expansion.

Respectfully submitted,

MORTIMER SPIEGELMAN  
S. S. WILKS  
HOLBROOK WORKING



# COMMITTEES AND ASSOCIATION REPRESENTATIVES FOR 1953

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John A. Clausen  
William W. K. Freeman

### Ad Hoc Committee on Publications Policy

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Robert Bechhofer  
Joseph M. Cameron  
William B. Simpson

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Simon Kuznets  
Isador Lubin  
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### Committee on Bibliography in Sampling

Benjamin J. Tepping

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Forman Acton  
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Rudolph Modley

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## COMMITTEES *Continued*

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Wilfred J. Dixon  
A. H. Bowker  
John E. Freund  
Henry L. Lucas  
William G. Madow  
Robert J. Monroe  
Margaret C. Packer  
J. A. Rigney

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William G. Cochran  
Frederick Mosteller  
John W. Tukey

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Paul S. Dwyer

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Ralph R. Shaw

**American Standards Association—Office Procedures**  
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**American Standards Association—Z16 Accidents Statistics Committee**  
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## REPORT OF THE COMMITTEE ON TRAINING IN STATISTICS

Since many statisticians who are interested in problems of statistical training were unable to present their views at the annual meeting of the Association, the following material is submitted to the membership of the Section and comment is invited.

The business meeting of the Section on Training in Statistics was held on December 28, 1952, under the chairmanship of P. J. McCarthy, who presented to the members of the Section a first draft of a charter for the Section. This draft was prepared on the basis of suggestions solicited from the members of the 1952 Section Committee, who were:

W. J. Dixon, Chairman Elect, University of Oregon  
P. C. Clifford, Secretary, Montclair State Teachers College  
Charles Glover, American Telephone & Telegraph Company  
Harry Roberts, University of Chicago  
John Smith, American University

The proposed charter for the Section is herewith presented to the membership for comment and criticism. [The three levels of training indicated under *Scope* might be referred to as (1) reader, (2) formulator and (3) solver.]

### PROPOSED CHARTER

#### SECTION ON TRAINING IN STATISTICS AMERICAN STATISTICAL ASSOCIATION

##### *Organization*

Membership in the Section shall include all active members of the American Statistical Association who indicate by response to inquiry from the office of the Association an interest in the activities of the Section.

The Annual Meeting of the Section shall be held in connection with the Annual Meeting of the American Statistical Association and shall be announced in advance, preferably in the printed program of that meeting.

The officers of the Section shall consist of a Chairman and Chairman-elect. Nominations shall be made by a subcommittee appointed six weeks before the Annual Meeting by the Chairman of the Section, or by nomination from the floor at the Annual Meeting. Election shall be by majority vote of members of the Section present, or represented by proxies in written form, at the Annual Meeting, subject to the approval of procedures by the President of the Association. The Section, the Section Committee, or the officers may designate such subcommittees as they wish to carry out the functions of the Section.

The management of the affairs of the Section between Annual Meetings shall be entrusted to a Section Committee composed of the officers and six other individuals appointed by the President of the Association on nomination of the officers of the Section or designation by vote at the Annual Meeting of the Section. The six appointed members of the Section Committee shall have two-year terms, these terms being staggered so that three new members are appointed each year.

#### Scope

The Section on Training is broadly interested in the effective use of training as a means (1) toward improving the quality of existing applications of statistical method and (2) toward increasing the use of statistical method in those areas of study where it offers the most efficient procedure for attacking unsolved problems.

In considering these objectives, the Section will recognize that training in statistics can be obtained either "on the job" or in educational institutions. Furthermore, the Section will distinguish three levels of training in statistics. These are:

- (1) Training of individuals working in a subject matter field other than statistics to the point where they can evaluate the applications of recognized statistical methods reported in their professional literature and can make use of statistical techniques in their own work.
- (2) Training of individuals working in a subject matter field other than statistics to the point where they can *creatively* apply statistical techniques to work in the field.
- (3) Training of individuals who wish to pursue a career as statisticians.

#### Functions

The Section on Training will engage in such activities as will contribute toward the goal set forth in the preceding section. In general these will be:

- (1) Dissemination of information on
  - (a) short courses
  - (b) standard training programs
  - (c) bibliography (textbooks, monographs, etc.)
  - (d) teaching aids
- (2) Organization of programs
  - (a) meetings of national societies
  - (b) summer seminars or workshops for teachers
- (3) Cooperation with other sections and societies
  - (a) advice to committees of other sections or societies
  - (b) cooperation with other committees and societies on training problems or curricula construction.

#### Amendments

This Charter may be amended by joint action of the Board of Directors of the Association and the Section.

Other activities of the 1952 Committee included a paper, "Statistics as a Career" by Howard Jones and Harry Roberts, which appeared in the *Statistician*; a paper entitled "Course Content, Curricula and Degree Requirements in Statistics," presented by John Smith at the Summer Statistics Conference at Blue Ridge; and two programs titled "Demonstration and Experiment in the Teaching of Statistics" and "Elementary Statistics Courses in Relation to New Developments in Theory," presented at the Annual Meeting. The committee also replied to requests for information on problems of training in statistics which had been forwarded to the Chairman by the national office of the American Statistical Association.

The members of the 1953 committee are:

- W. J. Dixon, Chairman, University of Oregon  
J. A. Rigney, Chairman-Elect, North Carolina State College  
Margaret Packer, Bell Telephone Laboratories (a)  
R. J. Monroe, Air Force, Missile Test Center (b)  
H. L. Lucas, North Carolina State College (c)  
A. H. Bowker, Stanford University (d)  
W. G. Madow, University of Illinois (e)  
J. E. Freund, Editor, Alfred University

To facilitate the work of the Committee, the above members were chosen to represent primarily the following areas of training:

- (a) Professional workers (chemistry, public health, etc.) who wish to improve the effectiveness of their work by an understanding of the concepts and methods of statistics but whose primary interest will remain in their original fields.
- (b) Students, not primarily concerned with statistical methods, who are engaged in experimental or investigational work which can be made more meaningful by the introduction of a few basic statistical concepts and the use of statistical methods that are applicable to their particular fields of study.
- (c) Students who are being trained in statistical methods and theory as a minor study in order to improve the effectiveness of some other major field of study.
- (d) Students who are being trained in statistics as a major study but who do not expect to carry their study through to the creative professional level.
- (e) Students who are being trained for the creative professional level, in either theoretical or applied statistics.

Respectfully submitted,

J. E. FREUND, *Editor*  
*Committee on Training in Statistics*

# QUESTIONS and ANSWERS

Edited by W. S. CONNOR  
I. R. SAVAGE

## BUS WAITING

An answer has been received to Question 35, which first appeared in Volume 5, Number 4, and is repeated here for the convenience of the reader.

**Question 35.** Users of public transportation often complain that while waiting for a bus to go downtown, an unexpectedly large number of buses go by in the uptown direction. Of course, these complaints are also made by people on the other side of the street, who are waiting for a bus to go uptown. If one assumes some "reasonable" statistical behavior for the buses, is there a basis for these complaints?

J. Q. P.

**Answer:** The answer is yes. Let us start out by developing a little theory. Let

$P(n)$  = the probability that  $n$  northbound buses arrive before the first southbound bus, and

$Q(s)$  = the probability that  $s$  southbound buses arrive before the first northbound bus.

The expected values of  $n$  and  $s$  will be called  $E(n)$  and  $E(s)$  respectively. It is clear from the definitions that the first bus will be northbound with probability  $Q(0)$  and southbound with probability  $P(0)$ . If simultaneous arrivals are excluded, then

$$P(0) + Q(0) = 1$$

and

$$\sum_{n=1}^{\infty} [P(n) + Q(n)] = 1.$$

$$\text{Therefore } E(n) + E(s) = \sum_{n=1}^{\infty} n[P(n) + Q(n)] \geq 1.$$

The equality will hold only if  $P(n)$  and  $Q(n)$  are zero for all values of  $n$  greater than one. Hence, any model in which it is possible to have two consecutive buses in the same direction will cause the sum of the expectations to be greater than one.

So  $E(n) + E(s)$  has a lower bound: one. Does it have an upper bound? The following example shows that it does not. Consider a schedule which is followed exactly in which northbound buses arrive on the minute for  $k$  consecutive minutes, then southbound buses arrive on the minute for the next  $k$  consecutive minutes, and so on. In this case

$$P(0) = 1/2,$$

$$P(n) = 1/2k, \text{ for } n = 1, 2, \dots, k,$$

$$P(n) = 0, \text{ for } n > k, \text{ and}$$

$$E(n) = (k + 1)/4.$$

The model is symmetrical, so  $Q(n) = P(n)$  and  $E(s) = E(n)$ . Therefore

$$E(n) + E(s) = (k + 1)/2,$$

which can be made arbitrarily large.

Now let us return to the original question. What is a "fair" schedule, which the rider might use as a standard in order to see whether he was being discriminated against? Presumably the riders in both directions would consider it "fair" if buses arrive at equal intervals in alternate directions. This is a special case of the preceding, with  $k=1$ . A "fair" schedule, then, is one for which

$$P(0) = Q(0) = 1/2,$$

$$P(1) = Q(1) = 1/2,$$

$$E(n) = E(s) = 1/2.$$

It is reasonable to suppose that the riders in both directions would feel unfairly treated if  $E(n)$  and  $E(s)$  are both greater than one-half. A plausible example will now be given for which this is true.

**EXAMPLE.** Suppose that the buses in each direction arrive according to a Poisson distribution, with average "headways"  $H_N$  and  $H_S$  for northbound and southbound buses respectively. That is, the probability that exactly  $n$  northbound buses arrive in the interval of time 0 to  $t$  is

$$p(n, t) = [(t/H_N)^n e^{-t/H_N}]/n!,$$

and similarly the probability that  $s$  southbound buses arrive in the interval is

$$q(s, t) = [(t/H_S)^s e^{-t/H_S}]/s!.$$

Further it is assumed the numbers of buses arriving from the two directions are independent.

Let  $r(n, t)$  be such that  $r(n, t) \Delta t$  is the probability that exactly  $n$  northbound and 0 southbound buses arrive in the interval 0 to  $t$ , and one southbound bus arrives in the interval  $t$  to  $t + \Delta t$ . Then clearly

$$r(n, t) \Delta t = p(n, t) q(0, t) q(1, \Delta t)$$

and

$$r(n, t) dt = p(n, t) q(0, t) dt/H_S,$$



so that

$$P(n) = \int_0^{\infty} r(n, t) dt$$

$$= R/(1 + R)^{n+1},$$

where  $R = H_N/H_E$ .

Similarly

$$Q(s) = R^s/(1 + R)^{s+1}.$$

Also

$$E(n) = R^{-1},$$

and

$$E(s) = R.$$

$E(n)$  and  $E(s)$  will both exceed one-half if  $1/2 < R < 2$ , i.e. if the average headway is less than twice the smaller. To have a fifty-fifty chance that the first bus will be in the desired direction,  $R$  must be one, in which case  $E(n) = E(s) = 1$ .

Other plausible examples can be given.

Morton S. Raff

## THE RANGE IN SAMPLES FROM A FINITE RECTANGULAR POPULATION

**Question 37.** What is the distribution of the range in samples from a finite rectangular population if repetitions are not allowed? What are the mean and variance of this distribution?

J. Q. P.

**Answer:** Consider the set of  $N$  consecutive integers  $0, 1, 2, \dots, N-1$ . Take a sample of  $n$  from this set. Repetitions are not allowed. Obviously  $n \leq N$ . In order for the range of the sample to be equal to  $R$  it is of course necessary for the extreme values to differ by  $R$ . This leaves  $R-1$  integers between the extremes of the sample and from these integers we may select the remaining  $n-2$  members of the sample. That is, for each pair of extremes there are  $C_{n-2}^{R-1}$  possible samples. However, it is easy to see that there are  $N-R$  pairs of extremes for which the range is  $R$ . Consequently the number of samples having the range  $R$  is

$$f(R) = C_{n-2}^{R-1} (N - R); \quad R = n - 1, \dots, N - 1.$$

Since the number of possible samples of size  $n$  is  $C_n^N$ , the relative frequency or probability of the range  $R$  is

$$p(R) = \frac{C_{n-2}^{R-1} (N - R)}{C_n^N}; \quad R = n - 1, \dots, N - 1.$$

A considerable amount of algebraic manipulation, principally involving the summation of certain finite series, will show that the mean and the variance of this distribution are, respectively,

$$\bar{R} = \frac{n-1}{n+1} (N+1),$$

$$u_2 = \frac{2(n-1)(N+1)(N-n)}{(n+1)^2(n+2)} = \frac{2(N-n)}{(n+1)(n+2)} \bar{R}.$$

Paul R. Rider

## ANNUAL CONVENTION OF THE AMERICAN SOCIETY FOR QUALITY CONTROL

The American Society for Quality Control is holding its seventh annual convention on May 27-29, 1953, at Convention Hall, Philadelphia. Educational sessions, to be held each afternoon, will include lectures on advanced statistical techniques and their applications. At the technical sessions to be held both morning and afternoon a number of outstanding speakers will describe the techniques they have used to make successful installations or solve their statistical quality problems. Arrangements have also been made for plant tours.

Further information may be obtained from J. V. Hart, Registrar, P. O. Box 5227, Philadelphia 26, Pa.

## NEWS ABOUT MEMBERS

**A Harry Alpert** has transferred from the Office of Statistical Standards, Bureau of the Budget, to the Program Analysis Office of the National Science Foundation.

**Mary R. Anderson** is now Assistant Professor of Psychology at Kansas State College, Hays, Kansas.

**Joseph C. Armour** (Captain USA) has been transferred from the Brooke Army Medical Center at Fort Sam Houston, Texas, to the Chief Surgeon's Office, U. S. Army—Europe, to assume duties as Comptroller of the U. S. Army Medical Services in Europe.

**B R. S. Bingham, Jr.,** has transferred from the Atlas Powder Co., Blasting Supplies Works, at Tamaqua, Pa., to the Atlas Powder Co., Volunteer Ordnance Works, Chattanooga, Tenn., where he is Q. C. Supervisor and Technical Assistant to the Production Control Superintendent. He was recently elected Chairman of the newly-formed Chemical Division, American Society for Quality Control.

**W. Randolph Burgess** has been appointed Deputy to the Secretary of the Treasury to work on debt management and international financial problems. Mr. Burgess was formerly Vice-Chairman of the National City Bank of New York, and since 1948 has been Chairman of its Executive Committee. He has also been Chairman of the Board of City Bank Farmers Trust Co. and director in a number of corporations. He has long been active in the American Statistical Association, of which he was formerly President and is now a Fellow.

**C Santo F. Camilleri** is now employed as a social statistician in the Department of Sociology and the Public Opinion Laboratory of the University of Washington.

**D W. J. Dixon** is on Sabbatical leave from the University of Oregon, and will be at the Rand Corporation, Santa Monica, Calif., until July.

**John J. Donnelly**, Lt. Col., Corps of Engineers, was recently retired by the Army after thirty years service. He has returned to his former position as Supervisor of the Bureau of Research and Statistics, Massachusetts Department of Public Welfare, in Boston.

**Louis J. Ducoff**, formerly Head of the Farm Labor Section in the Division of Farm Population and Rural Life, U. S. Bureau of Agricultural Economics, has been named Assistant Head of the Division of Farm Population and Rural Life, with special responsibilities in the field of agricultural manpower.

**F Merrill M. Flood** has left the Rand Corporation and is spending the first half of 1953 at Columbia University where he is serving as Director of the Behavioral Models Project. This is an interdepartmental project established recently, under Office of Naval Research sponsorship, to conduct research on the application of mathematical and statistical techniques to problems in economics and the behavioral sciences.

**Donald L. Foley**, formerly Assistant Professor of Sociology at the University of Rochester, is now a Research Associate with the Bureau of Applied Social Research, Columbia University, working on the World Urban Resources Index.

**Marion B. Folsom** has been named Undersecretary of the Treasury with particular responsibility for the field of taxation and supervision of the Bureau of Internal Revenue. Mr. Folsom was formerly with the Eastman Kodak Co., of which he has been Treasurer since 1935 and a director since 1947. He has also been a director of the U. S. Chamber of Commerce and Chairman of the Board of Trustees for the Committee for Economic Development.

**Irwin Friend**, Chief of the Business Structure Division of the Office of Business Economics, U. S. Department of Commerce, is on a year's leave of absence to join the faculty of the Wharton School of Business and Finance, University of Pennsylvania.

**H Margaret Jarman Hagood**, formerly Head of the Farm Population Section, Division of Farm Population and Rural Life, U. S. Bureau of Agricultural Economics, has been named Head of the Division of Farm Population and Rural Life.

**John H. Hargrove**, formerly with the Wage Stabilization Board, Dallas, Texas, is now Statistician-Economist for the Texas Research League, Austin, Texas—a private governmental research organization.

**Bernard Harris**, formerly a mathematical statistician at the Census Bureau, has transferred to the National Security Agency as a mathematician. He is also an Instructor in Statistics at George Washington University.

**William T. Hirnyck** is now Supervisor, Statistical Quality Control Department, Blasting Supplies Works, Atlas Powder Co., at Tamaqua, Pa.

**K Wharton F. Keppler**, formerly with M & R Dietetic Laboratories, Inc., has been Statistical Quality Control Specialist on the Quality Control Directorate Staff of the Central Air Procurement District, USAF, Detroit, during the past year.

**Newton B. Knox**, statistical consultant with the Office of the Coordinator, International Statistics, U. S. Bureau of the Census, is in Montevideo, Uruguay, on an assignment as statistical consultant to the Government of Uruguay.

**M Eli S. Marks**, formerly Chief of the Response Research Unit, Office of the Assistant Director for Statistical Standards, Bureau of the Census, is now with the National Opinion Research Center, University of Chicago.

**P Don Paarlberg** has been granted leave from Purdue University, where he has been Professor of Agricultural Economics, to become Assistant to the Secretary of Agriculture.

**Charles S. Parsons**, formerly Chief Economist for the Machinery Branch of the Office of Price Stabilization, has joined the staff of the Marketing Research Section, Apparatus Sales Division of the General Electric Co., Schenectady, N. Y.

**Stanley Peterfreund** has become a partner in Douglas Williams Associates, New York City, specialists in attitude surveys in business and industry.

**James A. Pierce** is now associated with the Engineering Department of Beech Aircraft Corporation, Wichita, Kansas.

**D. A. Probst**, formerly of the Institute of Statistics, University of North Carolina, is now completing work for the Ph.D. degree in Petroleum Geology at Northwestern University.

**Ruth R. Puffer** has taken a position as Head of the Epidemiology and Statistics Section in the Regional Office of the World Health Organization, Washington, D. C. She was formerly Director of Statistical Service in the Department of Public Health of the State of Tennessee.

**R John Rivoire**, formerly with the Production and Marketing Administration, U. S. Department of Agriculture, is now working for Charles Pfizer and Co., Inc., as a market analyst. He is also studying for the Ph.D. degree in Economics at Fordham University.

**Alan C. Rogers** has transferred from the Office of Small Business of the National Production Authority to the Manpower Control Division, Office of the Assistant Chief of Staff, Department of the Army.

**S Jack Silber**, Professor of Mathematics at Roosevelt College, Chicago, has returned from a tour of duty as Operations Analyst with the Fifth Air Force in Korea.

**Jack S. Silver**, formerly with the Department of the Air Force, has been appointed as a statistician in the Office of the Assistant Director for Statistical Standards, Bureau of the Census.

**George B. Spear**, formerly Director of Chemical Research, American Photocopy Equipment Co., Chicago, is now Technical Director, Photo Paper Products, Inc., St. Louis, Missouri.

**W Howard Wachspress** is now employed as a statistician by the Emerson Radio and Phonograph Corporation, New York City.

**Frederick E. Ward**, formerly Market Research Manager for Culligan, Inc. of Northbrook, Ill., is now President of Culligan Soft Water Service, Inc., Forest Park, Ill.

**Helen R. White** has been made Acting Head of the Farm Population Section in the Division of Farm Population and Rural Life of the U. S. Bureau of Agricultural Economics.

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The Association announces with regret the death of E. A. Goldenweiser on April 1 in Princeton, N. J. Professor Goldenweiser was a Past President and Fellow of A.S.A. An article on Professor Goldenweiser will appear in the next issue of *The American Statistician*.

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The Association announces with regret the death of Armand Julin, Honorary Member of ASA since 1924. Monsieur Julin, who resided in Brussels, was also an Honorary Member of the Statistical Societies of Paris, Argentina, Czechoslovakia and Hungary, as well as being Honorary President of the International Statistical Institute and a founding member of the Statistical Society of Belgium.

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## WHAT IS ACTUARIAL SOUNDNESS IN A PENSION PLAN

The proceedings of a panel meeting held at the Annual Meeting of the Association on December 29, 1952 in Chicago. Price, 75 cents. Available from the Secretary's office.

American Statistical Association  
1108 16th Street N.W.  
Washington 6, D. C.

## CHAPTER NOTES

### ALBANY

At the dinner meeting held on January 20th, Dr. Theodore H. Brown, Professor of Business Statistics at the Harvard Graduate School of Business Administration, was the principal speaker. The subject of his address was, "This Statistical Age." The March meeting heard Dr. Max A. Woodbury of the Wharton School of Finance and Commerce, University of Pennsylvania, on "Statistical Decisions and the Theory of Games."

The Education Committee of the Chapter is sponsoring a series of seminars. The first of these was a discussion of "Errors in Assuming Normality of Distribution" held on February 10th.

### CENTRAL NEW JERSEY

The February meeting heard a talk on "The Recent Decline in the Age of Marriage." The speaker was Mr. John Hajnal, who has worked in the field of population statistics for the British Royal Commission on Population, the United Nations, and the Office of Population Research at Princeton.

### CHICAGO

At the February 25th dinner meeting Ewan Clague, Commissioner of the United States Bureau of Labor Statistics, discussed the Revised Consumers' Price Index. Joint luncheon meetings with the American Marketing Association were held on February 5th, at which Robert K. Burns of the Industrial Relations Center, University of Chicago, spoke on "Techniques of Employee Morale Auditing," and on March 2nd, at which Dr. Jacob Marschak of the Cowles Commission discussed "Business Organization and the Theory of Teams." Luncheon meetings were also held on February 19th, with Gene Miller, Director of the Statistical Division, National Safety Council, speaking on "Presenting Accident Facts," and on March 19th, with Peter G. Peterson, Managing Director of Market Facts, Inc., and Lecturer in Marketing at the University of Chicago, discussing "The How's and Why's of a Research Study for a Public Utility."

### CLEVELAND

The twenty-seventh annual meeting of the Chapter was held on February 17th. The following officers were elected:

President, Gale R. Ober, Jr., Howard Whipple Green and Associates

Vice-President, Clark Zimmerman, McCann-Erickson, Inc.  
Secretary, M. F. Vincent, Ohio Bell Telephone Co.  
Member of the District Committee, Fred O. Kiel, Federal Reserve Bank of Cleveland  
Program Chairman, Fred C. Leone, Case Institute of Technology  
Dr. David Frazier, Senior Research Associate at the Standard Oil Company of Ohio, spoke on "Statistically Designed Experiments in Petroleum Research."

The Business Statistics Section of the Cleveland Chapter has held three meetings with four more scheduled for the balance of the current season.

### CONNECTICUT

The following officers were elected at the annual meeting held in New Haven on January 20th:

President, David Pinsky, Director of Labor Statistics, State Department of Labor, Hartford, Conn.  
Vice-President, David F. Votaw, Jr., Assistant Professor, Yale University, New Haven, Conn.  
Secretary, Roger Stark, The University of Connecticut, Storrs, Conn.

### DETROIT

At the February meeting, Dr. Angus Campbell, Director of the Survey Research Center at the University of Michigan, discussed statistical problems in studying the vote. The Center has been engaged in studies aimed at discovering motivations in voting. The March meeting heard a talk by Dr. M. Frances Estep, Research Director, Roger Bellows and Associates, on "Large Matrix Problems and Electronic Computers."

### LOS ANGELES

At the meeting of February 25th the speaker was Dr. Alexander Mood, Research Mathematician of the Rand Corporation. His subject was "Assumptions Involved in Making Statistical Tests."

### NEW ORLEANS

At the January meeting the following officers were elected:

President, Sully C. Pecot, Statistical Dept., New Orleans Public Service, Inc.

1st Vice-President and Chairman of Program Committee, Mrs. Opal S. Looby, Labor Analyst, Division of Employment Security, Louisiana Department of Labor  
2nd Vice-President and Chairman of Membership Committee, A. C. Dietrich, Southern Pine Association  
Secretary-Treasurer, Richard W. Graves, Instructor in Statistics, Tulane University

### OKLAHOMA CITY

At the February 4th meeting several items of business were taken up, after which Professor Mitchell Locks of the University of Oklahoma Bureau of Business Research spoke on the application of Econometrics. This was followed by discussion.

### PHILADELPHIA

The subject of the February 27th dinner meeting was "Current Problems in National Income Statistics." George Jaszi, Chief of the National Income Division of the Office of Business Economics, U. S. Department of Commerce, was the principal speaker. Professor Raymond T. Bowman of the Economics Department of the University of Pennsylvania led the discussion.

### ST. LOUIS

A luncheon meeting was held on February 18th at which William H. Winfield, Director of Business Research in the Organic Chemical Division of the Monsanto Chemical Company spoke on "The Role of Statistics in Business Decisions."

### TULSA

At the January meeting of the newly-formed Tulsa chapter the following officers were elected:

President, Leslie Brooks, Leslie Brooks & Associates  
1st Vice-President, Robert Patton, Monroe Company  
2nd Vice-President, Milton Searl, Stanolind Oil & Gas Company  
Secretary, Edwin Terry, Oklahoma State Employment Service



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